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Revision 0

Field Sampling Plan for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10

Idaho Completion Project

Bechtel BWXT Idaho, LLC

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Idaho Completion Project
Idaho Falls, Idaho 83415

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Approved by

Gary E. McDannel
WAG 1 Project Engineer

9/9/04
Date

James J. Jessmore
TAN V-Tanks Project Manager

9/9/04
Date

ABSTRACT

This Field Sampling Plan describes the Idaho National Engineering and Environmental Laboratory, Test Area North, Technical Support Facility (TSF), Waste Area Group 1, Operable Unit 1-10 contaminated soil removal and waste characterization activities at the TSF-09/18 (V-Tanks) and TSF-21 sites (Valve Pit 2). The area requiring investigation is suspected soil contamination adjacent to the V-Tanks, around TSF-21, and all areas associated with V-Tank removal activities. The purpose of this plan is to (1) perform CERCLA confirmation sampling of near surface (< 10 ft below ground surface) soil remediation areas, (2) collect data for establishment of institutional controls in subsurface soil remediation areas, and (3) provide for implementation of all substantative requirements of the sampling identified in the *Hazardous Waste Management Act/Resource Conservation and Recovery Act Closure Plan for the Test Area North/Technical Support Facility Intermediate Level Radioactive Waste Management System Phase II: Feed Subsystem (V-Tanks)* and the *Record of Decision Amendment for the V-Tanks (TSF-09 and TSF-18) and Explanation of Significant Differences for the PM-2A Tanks (TSF-26) and TSF-06, Area 10, at Test Area North, Operable Unit 1-10*. Sampling of the granulated activated carbon and high-efficiency particulate air filter from the exhaust of the V-Tank treatment skid is also identified to determine disposal requirements.

This Field Sampling Plan provides guidance for the site-specific investigation of the V-Tank area and Technical Support Facility-21 area, including sampling, quality assurance, quality control, analytical procedures, and data management. Use of this Field Sampling Plan will help ensure that data are scientifically valid, defensible, and of known and acceptable quality.

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ACRONYMS

AA	alternative action
AOC	area of contamination
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
COCs	Contaminants of Concern
D&D	decontamination and dismantlement
DD&D	deactivation, decontamination, and dismantlement
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DQO	data quality objective
DS	decision statement
EAC	estimate-at-completion
EPA	U.S. Environmental Protection Agency
ER	environmental restoration
ERA	early remediation activities
ERIS	Environmental Restoration Information System
ERO	Emergency Response Organization
ES&H	environmental, safety, and health
ESH&QA	environmental, safety, health, and quality assurance
ESP	Environmental Services Project
FFA/CO	Federal Facility Agreement and Consent Order
FOM	field operations manager
FR	Federal Register
FRG	final remediation goal
FSP	Field Sampling Plan

FTL	field team leader
GAC	granulated activated carbon
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations
HEPA	high-efficiency particulate air (filter)
HSO	health and safety officer
HWMA	Hazardous Waste Management Act
ICDF	INEEL CERCLA Disposal Facility
IDL	instrument detection level
IEDMS	Integrated Environmental Data Management System
IH	industrial hygienist
INEEL	Idaho National Engineering and Environmental Laboratory
ISMS	Integrated Safety Management System
IWTS	Integrated Waste Tracking System
MCP	management control procedure
MDL	method detection limit
NEPA	National Environmental Policy Act
OMP	Occupational Medical Program
OSHA	Occupational Safety and Health Administration
OU	operable unit
PCB	polychlorinated biphenyl
PM	project manager
POD	plan of the day
PPE	personal protective equipment
PQL	practical quantitation limits
PRD	program requirements document
PSQ	principal study question
QA	quality assurance
QA/QC	quality assurance/quality control

QAO	quality assurance objective
QAPjP	Quality Assurance Project Plan
QC	quality control
RadCon	Radiological Control
RCRA	Resource Conservation and Recovery Act
RCT	radiological control technician
RI/FS	remedial investigation/feasibility study
ROD	Record of Decision
SAM	Sample Analysis Management
SAP	Sampling and Analysis Plan
SE	safety engineer
SOW	Statement of Work
STL	sampling team leader
SVOC	semivolatile organic compounds
SWP	safe work permit
TAN	Test Area North
TBD	to be determined
TCP	TAN Completion Project
TPR	technical procedure
TSF	Technical Support Facility
UST	underground storage tank
VCO	Voluntary Consent Order
VOCs	volatile organic compounds
VPP	voluntary protection program
WAG	waste area group
WGS	Waste Generator Services

Field Sampling Plan for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation at Test Area North, Waste Area Group 1, Operable Unit 1-10

1. OVERVIEW

In accordance with the *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory* (FFA/CO) (DOE-ID 1991), the U.S. Department of Energy (DOE) submits this Field Sampling Plan (FSP) for soil and waste characterization in the Idaho National Engineering and Environmental Laboratory (INEEL) Test Area North (TAN) Technical Support Facility (TSF)-09/18 (V-Tanks) and TSF-21 sites. This FSP is implemented with the applicable sections of the latest revision of the *Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10, and Deactivation, Decontamination, and Decommissioning* (QAPjP) (DOE-ID 2004a). Together, this FSP and the QAPjP constitute the sampling and analysis plan for soil removal and waste consolidation at Waste Area Group 1, Operable Unit 1-10, Group 2 Sites, and are supporting documents to the comprehensive *Group 2 Remedial Design/Remedial Action Work Plan Addendum 2 for the TSF-09/18 V-Tanks and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10* (DOE/NE-ID 2004).

The V-Tank remediation project has two sets of complimentary sampling requirements. One set of requirements addresses the Resource Conservation and Recovery Act (42 USC § 6901) (RCRA) closure of the V-Tanks and is driven by the RCRA Closure Plan, the *Hazardous Waste Management Act/Resource Conservation and Recovery Act Closure Plan for the Test Area North/Technical Support Facility Intermediate-Level Radioactive Waste Management System Phase II: Feed Subsystem (V-Tanks)* (DOE-ID 2004e), and the associated field-sampling plan; *"Field Sampling Plan for the HWMA/RCRA Closure of the TAN/TSF Intermediate Level Radioactive Waste Feed Subsystem (V-Tanks),"* which is simply called the RCRA Sampling Plan (INEEL 2003a).

This FSP, simply called the "CERCLA Sampling Plan," addresses the other set of sampling requirements for the Comprehensive Environmental Response, Compensation, and Liability Act (42 USC § 9601) (CERCLA) cleanup action to ensure that the end-state condition of the V-Tank site meets the remedial action objectives. The RCRA Sampling Plan (INEEL 2003a) provides the rationale and the Data Quality Objective (DQO) process for the RCRA samples. The CERCLA Sampling Plan includes the implementation of the RCRA Sampling Plan in addition to confirmation sampling.

Figure 1-1 shows the remedial action decision points that must be supported by data collected through the use of these two complimentary sampling plans. This figure describes the three stages of excavation, displays the sequencing of surface and below-surface sampling, and shows the remedial action decision points that must be supported by data.

The RCRA Closure Plan (DOE-ID 2004e) requires that soil samples from the V-Tank footprint be collected and analyzed to confirm that the CERCLA-derived final remediation goals (FRGs) are protective with respect to Hazardous Waste Management Act (HWMA)/RCRA-regulated constituents.[a] Using the data collected from the RCRA sampling event, a CERCLA risk analysis will be performed to determine if additional contaminants of concern (COCs) need to be added to ensure that the final

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a. See Section 4.1.3 of the RCRA Closure Plan (DOE-ID 2004e), "Sample soils beneath the collecting and sump tanks following removal of these components [the V-Tanks] (e.g., surface soils within the excavation footprint) and analyze for HWMA/RCRA COCs to confirm CERCLA-derived FRGs are protective with respect to HWMA/RCRA-regulated constituents."

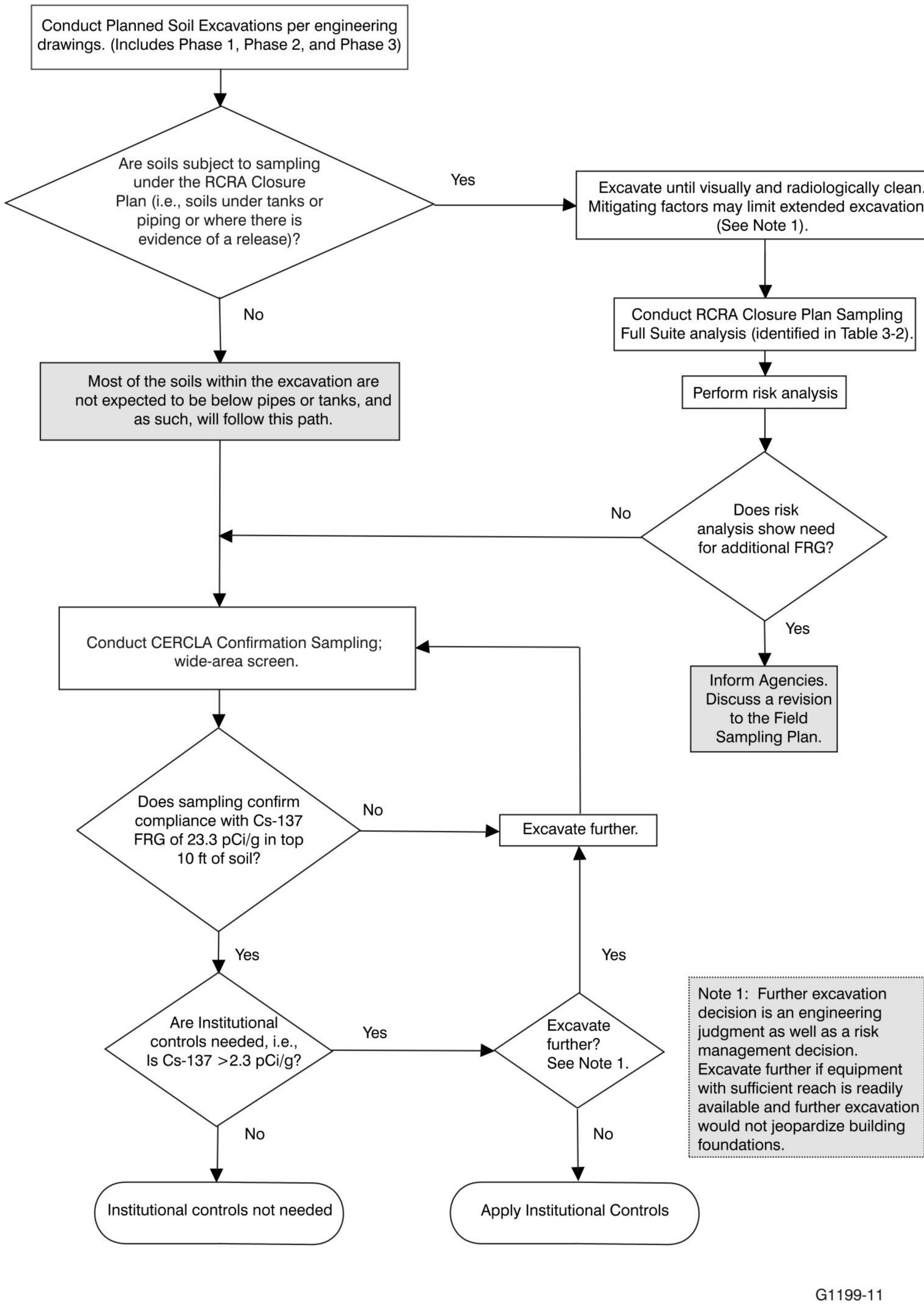

Figure 1-1. Decision diagram for RCRA closure and confirmation sampling.

remediation meets the remedial action objectives.[b] However, previous soil samples analyzed from the V-Tank Area of Concern (AOC) have indicated that cesium-137 (Cs-137) is an indicator of other contaminants of concern according to the *TSF-09/18 Calendar Year 2003 Early Remedial Action Activities Summary Report for Waste Area Group 1, Operable Unit 1-10* (ICP 2004a). In 2003, an in-situ gamma scan survey and additional surface and subsurface samples were collected in the TSF-09/18 area. The purpose of that sampling event was to use Cs-137 survey maps to define the extent of contamination for subsequent soil removal that is presented in the RD/RA Work Plan Addendum 2 (DOE/NE-ID 2004). Scanning was completed for 190 points over the entire area. Data from the screening survey were used to bias subsurface sampling (drilling) locations to verify and better define the TSF-09/18 and TSF-21 CERCLA AOC. The data also confirmed historical information in areas where radioactive surface contamination had occurred. Sampling, completed to further define the AOC, consisted of: (1) drilling in specific locations within the TSF-09/18 and TSF-21 sites and surrounding areas, (2) obtaining the vertical radiological profile of the area through downhole logging at those locations, and (3) collecting soil samples at specific locations.

The results of the 2003 surface scan confirmed the presence of Cs-137 in concentrations greater than 23.3 pCi/g above the V-Tanks. The survey and sampling also showed lower, but nevertheless elevated levels, of Cs-137 near the northeast corner of the former location of building TAN-615. The purpose of this sampling event was to use Cs-137 survey maps to define the extent of contamination for subsequent soil removal presented in the RD/RA Work Plan Addendum 2 (DOE/NE-ID 2004). Subsurface investigations at two deep boreholes showed a clear trend of decreasing Cs-137 concentrations with increasing depth.

Analytical soil data was obtained from four soil cores taken from two locations within the AOC, one location at TSF-21, and one location southwest of Tank V-9. Using these data along with other data, a risk assessment screen was used to analyze a risk acceptability of constituents other than Cs-137. The conclusion was that only Cs-137 was at issue with the contamination resulting from the V-Tank contents.

Activities for both the RCRA sampling and the CERCLA confirmation sampling will be conducted under this FSP; both sampling events will occur concurrently. However, if the risk analysis identifies additional contaminants of concern other than Cs-137, additional sampling and analysis will be required after further excavation: this additional sampling and analysis, if needed, would be covered in a revised FSP.

This FSP will be implemented within the V-Tank area to ensure that FRGs are met in all locations. These locations, identified on Figure 1-2 and further detailed in Table 3-2 and Section 4, are:

- Items 1, 2, 3, and 5. V-Tank excavation area, TSF-09 for tanks V-1, V-2, and V-3, TSF-18 for tank V-9 (Items 1 through 3) and Phase 3 soil excavation footprint (Item 5)
- Item 4. Valve Pit 2 (TSF-21)
- Item 6. TSF-21 cut pipe
- Item 7. Tank laydown area

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b. A remedial action objective (RAO) establishes risk reduction from all pathways and all COCs to a total excess cancer risk of less than 1 in 10,000, and a total hazard index of less than 1 for the hypothetical resident 100 years in the future and for the current and future worker.

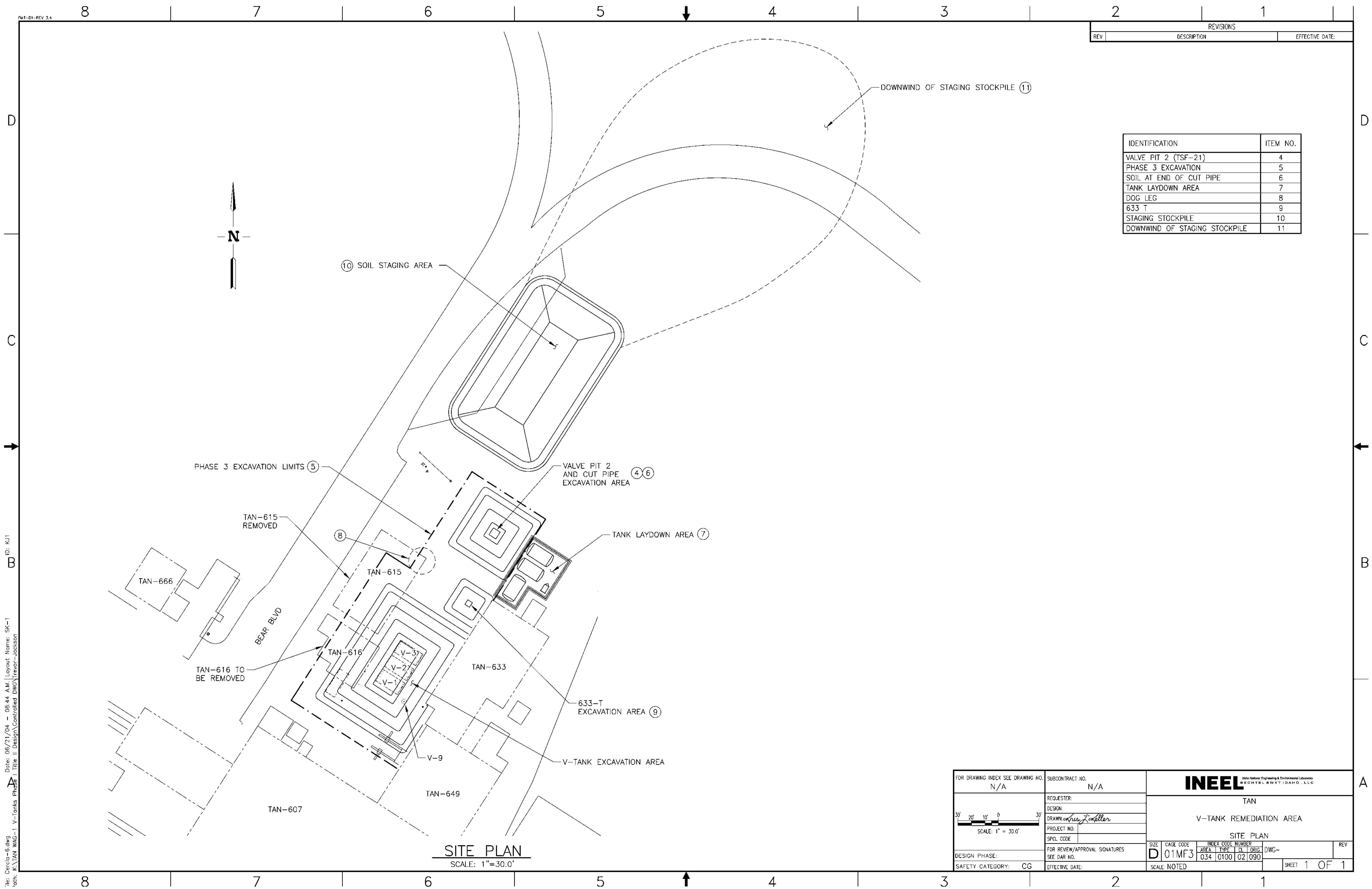

Figure 1-2. Area of contamination for the V-Tanks.

- Item 8. Dog-leg area (area around former building TAN-615, see Section 2.1.4)
- Item 9. 633 T (see Section 2.1.5)
- Item 10. Underneath the staging stockpile
- Item 11. Downwind of staging stockpile
- Item 12. Granulated activated carbon (GAC) on off-gas system of V-Tank treatment process
- Item 13. High efficiency particulate air (HEPA) filter on off-gas system of V-Tank treatment process.
- Item 14. Discretionary samples will be taken if deemed appropriate be the Field Team Leader.

The purpose of this FSP is to provide sampling to confirm that soil remaining at the V-Tanks site from 0 to 10 ft below ground surface (bgs) does not exceed the FRG for Cs-137 or FRG for other contaminants that are found as a result of RCRA closure sampling. Soils with contamination greater than 23.3 pCi/g of Cs-137 at 10 ft bgs, and soils at depths less than 10 ft with radiological contamination greater than 2.3 pCi/g but less than 23.3 pCi/g of Cs-137, will be evaluated on a case-by-case basis. This will be based on the reach of the excavation equipment, ease of removal, and other mitigating factors.

Soil sampling will be conducted in different areas. One area will include sampling within the Phase 3 excavation limits. The other areas include the tank laydown area, below the soil staging stockpile, and downwind of the staging stockpile. Soil sampling in different areas will also be conducted at different times. The first area will be sampled immediately after excavation of the V-Tanks. The other sampling episodes will occur at a later date.

The major components of the selected remedy for the V-Tanks include:

- to consolidation tanks located in the all-weather enclosure to be located north and west of TAN-616
- Transfer of miscellaneous waste to the consolidation tanks for subsequent treatment
- Excavation and removal of tanks, piping, and ancillary equipment
- Excavation of contaminated soil as necessary for tank removal
- Characterization and disposal of the removed tanks, pipes, and ancillary equipment at ICDF
- Soil confirmation sampling will be performed to confirm soil above the designated final remediation goal (FRG) for Cs-137 has been removed
- Soil sampling at the base of the tank excavations to confirm RAOs are met
- Backfilling the excavated areas with clean pit-run material, contouring and grading the area to provide appropriate site drainage
- Phase I treatment of liquid and sludge by air sparging to reduce VOC concentrations

- Onsite treatment of liquid and sludge
- Disposal of treated waste at the ICDF
- Disposal of waste treatment equipment at the ICDF
- Confirmation sampling in tank laydown area, soil staging area, and downwind of staging area will be performed after the tanks and staged soil have been removed.

The QAPjP (DOE-ID 2004a) and this FSP have been prepared in accordance with the "National Oil and Hazardous Substances Contingency Plan" (55 FR 46), the "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA" (EPA 1988), the FFA/CO (DOE-ID 1991), and Idaho Completion Project (ICP)- Management Control Procedure (MCP)-9439, "Environmental Sampling Activities at the INEEL." This FSP provides guidance for the Waste Area Group (WAG) 1, Operable Unit (OU) 1-10 site-specific investigation, including sampling, quality assurance (QA), quality control (QC), analytical procedures, and data management. Use of the FSP will help ensure that data are scientifically valid, defensible, and of known and acceptable quality. The QAPjP describes project objectives and quality assurance/quality control (QA/QC) protocols that will achieve the specified data quality objectives (DQOs). Use of the QAPjP will ensure that the data generated are suitable for their intended uses.

1.1 Field Sampling Plan Objectives

The primary objective of this FSP is to characterize soil remaining at the V-Tank excavation area to ensure that it meets the criteria identified below. Other areas to be sampled were identified earlier.

Sampling of the soils directly underneath the V-Tanks, Valve Pit 2, and other areas of suspected release, will be conducted under this Sampling Plan. Analysis of data from these samples will be used to conduct a risk analysis to determine if new CERCLA FRGs have been identified. If new FRGs are identified, this FSP will updated to include new sampling and analytical requirements to meet the new FRGs.

Based on the results obtained from the risk analysis, the list of target analytes identified for this FSP will be subject to revision. This FSP will direct the collection and analysis of samples that will provide data to support confirmation that soils remaining after excavation meet FRGs.

The excavation area identified in Figure 1-2 will constitute the area to be scanned after removal of the V-Tanks, valve pit, and other identified areas. If wide-area surface gamma scans locate radiological activity greater than 23.3 pCi/g of Cs-137, the contaminated soil will be removed using 1-ft lifts (nominal). This will continue until wide-area surface gamma scans show that contamination is below 23.3 pCi/g of Cs-137, or until the depth exceeds the ability of the machinery or other mitigating factors.

All removed soils may be stockpiled in the soil staging area identified in Figure 1-2 or placed in soil bags prior to disposal to the INEEL CERCLA Disposal Facility (ICDF). The soil to be removed from the contaminated area will be characterized and profiled by Waste Generator Services to verify compliance with the *Waste Acceptance Criteria for the ICDF Landfill* (DOE-ID 2004b). Verification sampling of the soil will be performed by Environmental Services Project (ESP) personnel to verify the soil to be disposed meets the ICDF WAC and the waste profile. This sampling effort is verification sampling and is not included in this FSP. Characterization of the soils within the V-Tanks remediation areas has been completed. This waste profile was based upon EDF-4619, Waste Generator Services Closure Report for Soils in the V-Tank Area (TSF-09, 18, and 21) – Use of Characterization Data from

Current and Historical Sources. The ICDF verification sampling approach will determine which constituents require verification sampling and analysis to ensure that the ICDF WAC is met.

Cesium-137 contamination presently at the V-Tank area is shown in Figures 1-3 and 1-4. Comparing these figures with Figure 1-2 shows that soils with contamination of Cs-137 greater than 23.3 pCi/g will be excavated prior to sampling. The area of high contamination identified in red in Figure 1-3 is addressed under the RCRA Closure Plan of the tanks (DOE-ID 2004e).

Wide-area gamma scans on a 35 × 35 ft grid will be conducted to determine if the cleanup criteria for that location has been met. If not, soils will continue to be excavated until the remaining soils are no longer above the specified criteria. The cleanup criteria for the soils remaining in the contaminated area is based on the level of Cs-137.

Confirmation sampling for Cs-137 will be based upon wide area screens using High Purity Germanium Detectors. These wide area screens will be used for both confirmation of compliance with the FRG for Cs-137 (Cs-137 less than 23.3 pCi/g in the top 10 ft of soil) and a determination of the need for institutional controls (Cs-137 in excess of 2.3 pCi/g at any depth).

For identifying contamination and waste profiling soils in the area of concern, sampling will be performed on an as-needed basis. If potentially contaminated areas are identified during these removals (i.e., radiological contamination), soil samples will be taken and analyzed by others for waste characterization and disposal purposes after the areas have been removed.

Personal protective equipment (PPE) and sampling equipment, will be managed in accordance with the *Waste Management Plan for the TSF-09/18 V-Tank and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10* (ICP 2004b).

1.2 Project Organization and Responsibility

The organizational structure illustrated in Figure 1-5 presents an overview of the general resources and expertise required to perform the work while minimizing risks to worker health and safety.

1.2.1 Test Area North Completion Project Director

The TAN Completion Project Director has the ultimate responsibility for the technical quality of all projects, maintaining a safe environment as well as the safety and health of all personnel during field activities performed by or for the TAN Completion Project (TCP). The TCP manager is responsible for the following:

- Compliance with the Project Execution Plan (PEP)
- Developing and maintaining integrated schedules to meet commitments, monitor progress, and to resolve priority conflicts
- Completing activities within project scope, schedule, and budget
- Establishing multidisciplinary teams to optimize the accomplishment of work

Figure 1-3. Arial location of cesium-137 greater than 23.3 pCi/g.

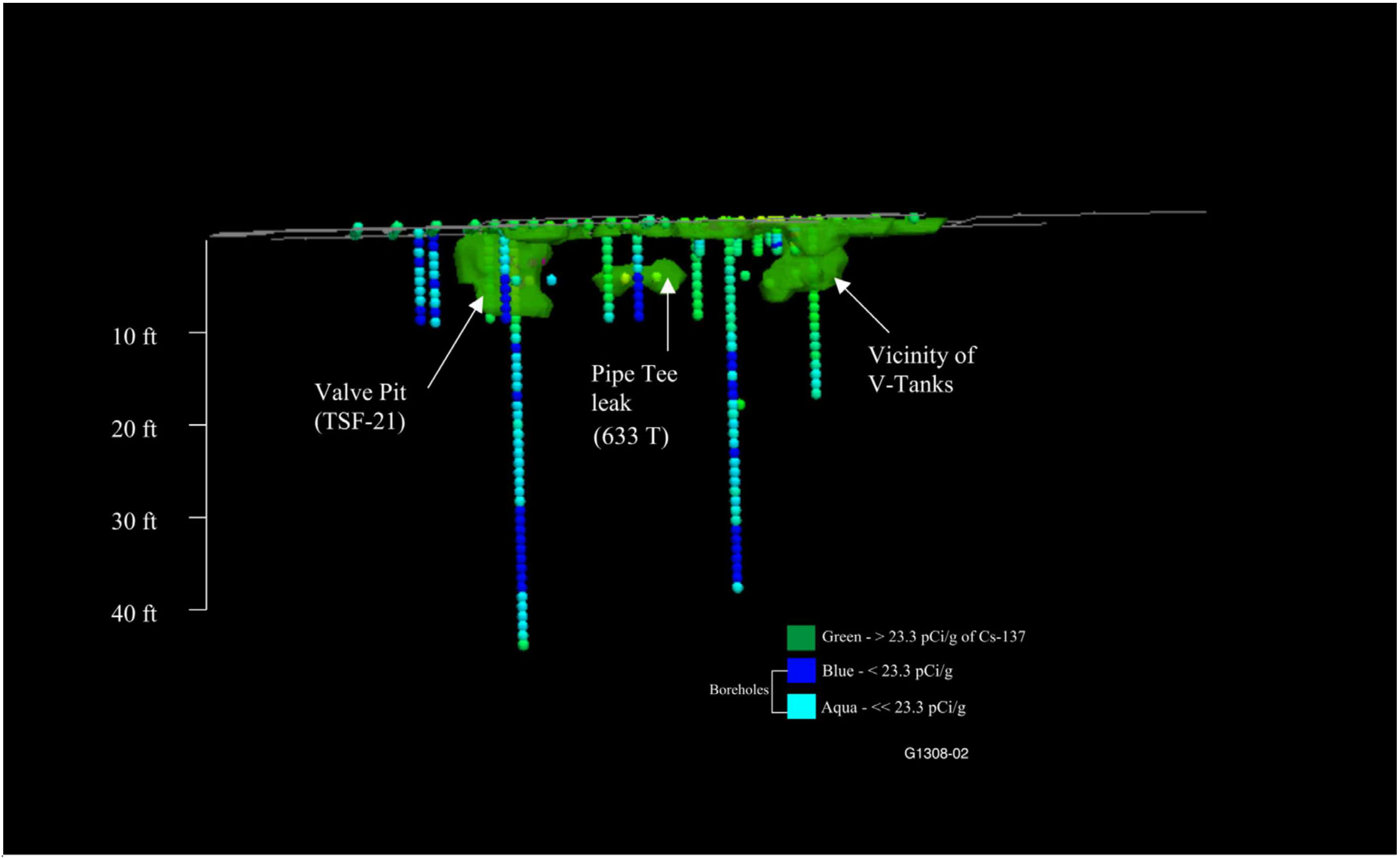

Figure 1-4. Cesium-137 contamination greater than 23.3 pCi/g by depth facing plant east from Building 616.

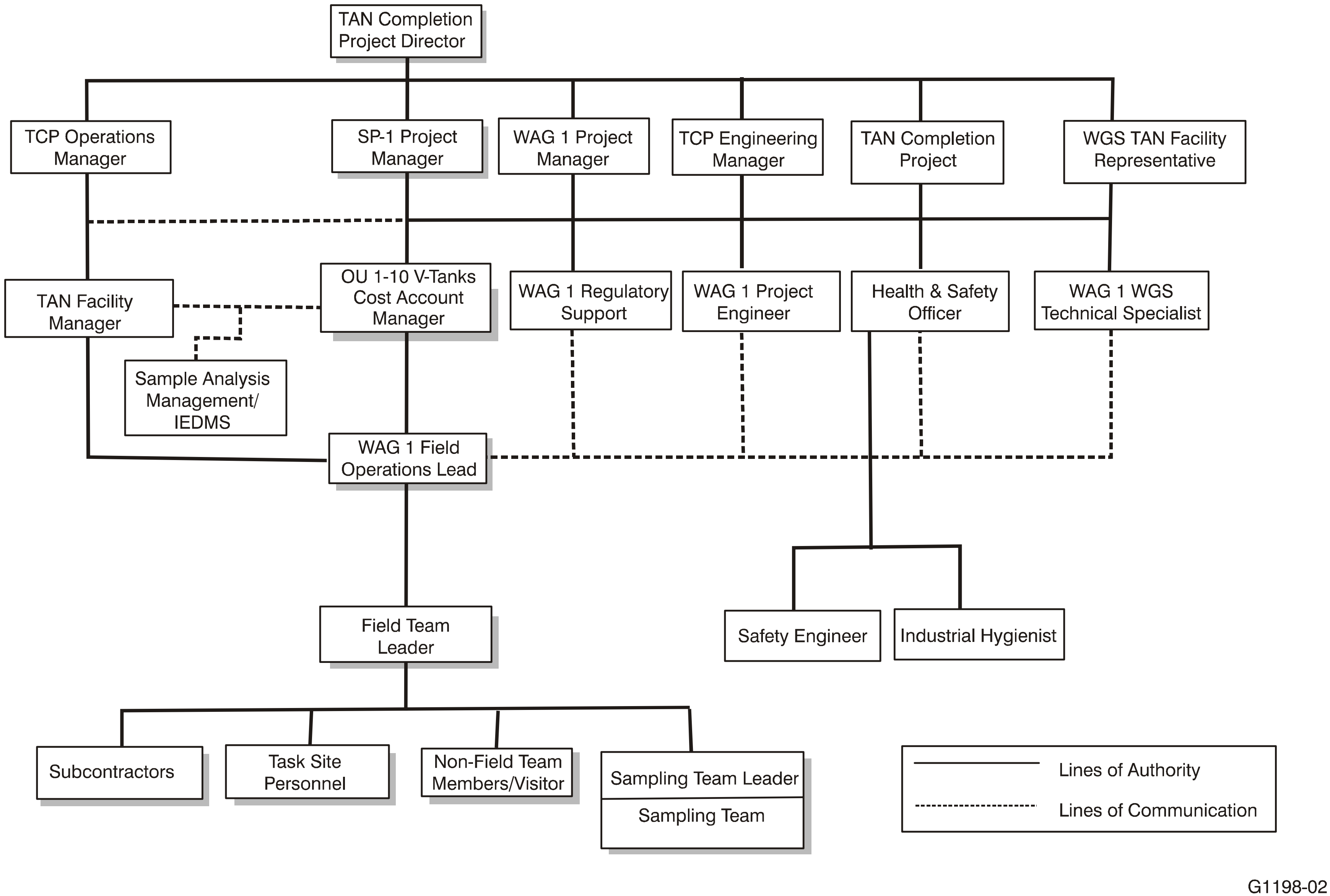

Figure 1-5. Overview of the Waste Area Group 1 organizational structure.

- Ensuring proper implementation of the Integrated Safety Management System (ISMS), Voluntary Protection Program (VPP), Conduct of Operations, Conduct of Maintenance, Nuclear Facility Startup/Restart, Hoisting and Rigging, Nonnuclear Safety Analysis, Nuclear Safety Analysis, and Criticality Safety

- Ensuring the development and implementation of the appropriate interface documents

- Ensuring facilities are operated safely meeting the requirements of authorization agreements, permits, and other safety basis documents

- Ensuring project activities are performed in accordance with applicable company policies and procedures

- Identifying (or performing the duties of) a project manager for each subproject performed within the project scope

- Maintaining a 5-year staffing plan in accordance with DOE Order 5480.19, "Conduct of Operations Requirements for DOE Facilities," as appropriate for the project

- Facilitate integration with other TAN projects for resources, equipment use, facility, and land use

- Interface with ICDF

- Interface with DOE and Regulatory Agencies.

1.2.2 Waste Area Group 1 Project Manager

The WAG 1 Project Manager (PM) or designee, such as the OU 1-10 V-Tanks PM, will ensure that all project activities are in compliance with the following guidelines and regulations:

The PM will ensure that employee job function evaluations (Form 340.02) are completed for all project employees, reviewed by the project industrial hygienist (IH) for validation, and submitted to the Occupational Medical Program (OMP) for determination of necessary medical evaluations.

Other functions and responsibilities of the PM include:

- Coordinating and interfacing with TAN deactivation, decontamination, and dismantlement (DD&D) and Voluntary Consent Order (VCO) projects

- Ensuring project integration efficiencies are realized and combined milestones are achieved

- Developing the documentation required to support the project

- Ensuring the technical review and acceptance of all project documentation

- Developing the site-specific plans required by the ER program, such as work plans; environmental, safety, and health (ES&H) plans; and sampling and analysis plans (SAPs)

- Ensuring that project activities and deliverables meet schedule and scope requirements as described in the FFA/CO, Attachment A, *"Action Plan for Implementation of the Federal Facility Agreement and Consent Order"* (DOE-ID 1991), and applicable guidance

- Supporting CERCLA and National Environmental Policy Act (NEPA) (42 USC § 4321) public review and comment processes by identifying their requirements

- Identifying the subproject technology needs

- Coordinating and interfacing with the units within the program support organization on issues relating to QA, ES&H, and NEPA support for the project

- Coordinating site-specific data collection, review for technical adequacy, and input to an approved database, such as the Environmental Restoration Information System (ERIS)

- Coordinating and interfacing with subcontractors to ensure milestones are met, adequate management support is in place, technical scope is planned and executed appropriately, and project costs are kept within budget.

1.2.3 TAN Completion Project Subproject 1 Manager

The TCP Subproject 1 Manager is line management and responsible for developing and managing the subproject. Responsibilities include:

- Providing information for budget approval, milestone commitments, and performance measures

- Developing and maintaining integrated schedules to meet commitments, monitor progress, and resolve priority conflicts

- Identifying to the Project Director the required resources to complete subproject work according to the project plan requirements and schedule

- Managing the appropriate subproject personnel in execution of project planning and monitoring of subproject progress

- Identifying to and assisting the Project Director in resolving conflicts between subproject priorities

- Ensuring that operational work for the subproject is authorized by the facility authority

- Ensuring startup activities (management self-assessment, readiness assessments, operational readiness reviews) are scheduled and completed through the appropriate facility authority

- Ensuring the desired operational activities are listed on the appropriate facility authority Plan of the Week, Plan of the Day

- Ensuring operational work for the subproject is directed through the appropriate Operation Director’s organization to accomplish the work safely and according to regulatory and company requirements

- Establishing a variance threshold for control account and project reporting

- Overseeing the preparation of the monthly project status report using variance data generated

- Overseeing the preparation of the estimate-at-completion (EAC) for both semiannual and monthly requirements

- Approving the monthly project status report and the EAC.

1.2.4 Operable Unit 1-10 V-Tanks Cost Account Manager

The OU 1-10 V-Tanks Cost Account Manager is responsible for the execution of the project's technical work. This includes, but is not limited to:

- Supervising engineers to ensure that timely, cost-effective engineering and design services are performed in accordance with project orders and directives, using sound engineering practices and high technical standards

- Providing technical resource and schedule integration, establishing priorities, and identifying and requesting the resources necessary to accomplish work objectives for all assigned engineering and design activities

- Ensuring that the work to be performed is clear, concise, and executable by working with the customer and the PM to establish firm project/task requirements

- Developing a project technical execution strategy and ensuring that cost-effective design solutions are developed in accordance with safety, environmental, and quality objectives

- Reviewing project status and variances and providing corrective actions

- Resolving conflicts regarding project requirements and project team members' comments.

In addition, the OU 1-10 V-Tanks Cost Account Manager is responsible for the project's technical staffing. This will include serving as an interface between the WAG 1 Project Manager and the appropriate functional managers of the organizations who provide the technical staff. The project engineer shall be accountable to the PM for all cost and schedule performance of the assigned technical tasks and to the functional managers for the technical quality of a project's work products.

1.2.5 Test Area North Facility Manager

The TAN Facility Manager reports to the TAN Operations Manager who reports to the TCP Director, and, therefore, the TAN Facility Manager must be informed of all activities performed in the area. The TAN Operations Manager and Facility Manager are responsible for the following functions and processes:

- Overseeing all work processes and work packages performed in the TAN area

- Establishing and executing a monthly, weekly, and daily operating plan for the TAN area

- Executing the Environmental, Safety, Health, and Quality Assurance (ESH&QA) program for the TAN area

- Executing the Integrated Safety Management System (ISMS) for the TAN area

- Executing Enhanced Work Planning for the TAN area

- Executing the Voluntary Protection Program (VPP) in the TAN area

- Ensuring environmental compliance within the TAN area

- Executing that portion of the voluntary compliance order that pertains to the TAN area
- Correcting the root cause functions of accident investigations in the TAN area
- Correcting the root cause functions of the Voluntary Consent Order (VCO) for the TAN area.

1.2.6 Sample Analysis Management

The INEEL Sample Analysis Management (SAM) office will obtain laboratory services as required to ensure that the generated data meet the needs of the project by validating all analytical laboratory data according to resident protocol, and to ensure that data are reported to the project personnel in a timely fashion as required by the FFA/CO (DOE-ID 1991).

The assigned SAM representative is responsible for:

- Generating task order statements of work (SOWs) and master task agreements
- Interfacing with the PM and/or designee during preparation of the sampling and analysis plan (SAP) database, as required by program requirements document (PRD)-5030, "Environmental Requirements for Facilities, Processes, Materials, and Equipment"
- Providing guidance on the appropriate number of field QC samples required by the QAPjP (DOE-ID 2004a)
- Providing guidance on the appropriate bottle size and preservation for sample collection
- Ensuring that the sample identification numbers used by the project are unique from all others ever assigned by the Integrated Environmental Data Management System (IEDMS).

The completion of the "SAM Services Authorization Form" (ICP 2004d) initiates the sample and sample waste-tracking activities performed by the SAM.

The SAM-contracted laboratory will have overall responsibility for laboratory technical quality, laboratory cost control, laboratory personnel management, and adherence to agreed-upon laboratory schedules. Responsibilities of the laboratory personnel include:

- Ensuring completion of chain-of-custody information
- Ensuring all QA/QC procedures are implemented in accordance with SAM-generated task order SOWs and master task agreements
- Preparing analytical reports.

1.2.7 TAN Completion Project Environmental Safety, Health, and Quality Assurance Manager

The TAN Completion Project (TCP) Environmental Safety, Health, and Quality Assurance (ESH&QA) manager, or designee, reports directly to the TCP Director and is responsible for managing ESH&QA resources, including:

- Ensuring that ESH&QA programs, policies, standards, procedures, and mandatory requirements are planned, scheduled, implemented, and executed in the day-to-day TCP operations

- Directing ESH&QA compliance in all activities by coordinating related functional entities and providing technical and administrative direction to subordinate staff.

Under the direction of the TCP Director, the TCP ESH&QA manager represents the TCP directorate in all ESH&QA matters and is responsible for:

- TCP ESH&QA management compliance

- Oversight for all TCP CERCLA and decontamination and dismantlement (D&D) operations planned and conducted at WAG 1

- TCP INEEL-wide environmental monitoring activities.

The TCP ESH&QA manager directs the management of personnel and the implementation of programs related to the following technical disciplines:

- Industrial safety
- Fire protection
- QA
- IH (matrixed)
- Emergency preparedness (matrixed)
- Criticality Safety (matrixed).

1.2.8 Health and Safety Officer

The health and safety officer (HSO) reports to the TAN Project Director and is assigned to the task site serves as the primary contact for all health and safety issues. Other safety and health (S&H) professionals at the task site, including the safety professional (SP), the industrial hygienist (IH), the radiological control technician (RCT), the radiological engineer, and the facility representative, support the HSO as necessary. The HSO advises the field team leader (FTL) on all aspects of health and safety and is authorized to:

- Stop work at the site if any operation threatens worker or public health and/or safety

- Verify compliance with the HASP (ICP 2004c) to conduct conformance inspections and self-assessments

- Require and monitor corrective actions

- Monitor decontamination procedures, as appropriate.

Personnel assigned as the HSO or alternate HSO must be qualified (pursuant to the OSHA definition) to recognize and evaluate hazards. The HSO or alternate will be given the authority to take or direct actions to ensure that workers are protected. The HSO may also serve as the IH, SP, or in some cases the FTL, depending on the hazards, complexity, and size of the activity involved and required concurrence from the ER S&H compliance officer. However, any other task-site responsibilities of the HSO must not conflict (either philosophically or in terms of overly increased volume of work) with the role of the HSO at the task site.

If the HSO must leave the site, he or she will appoint an alternate as the acting HSO. The identity of the acting HSO will be recorded in the FTL logbook and communicated to task-site personnel.

NOTE: *The HSO will ensure that the appropriate ESH&QA personnel participate in the development and verification of the hazards screening profile checklist in accordance with Standard (STD)-101, "Integrated Work Control Process," or MCP-3562, "Hazard Identification, Analysis and Control of Operational Activities."*

1.2.9 Waste Generator Services Test Area North Facility Representative and Waste Technical Specialist

Waste Generator Services provides INEEL onsite and offsite waste generators with turn-key professional waste management services to disposition legacy and newly generated waste in a compliant, timely, and cost-effective manner, and to ensure all treatment/storage/disposal waste acceptance criteria and other requirements are met (DOE-ID 2004b). Waste Generator Services is responsible to:

- Complete an initial evaluation of process knowledge and assign a probable waste type
- Coordinate with the WAG 1 OU 1-10 projects to determine waste generation issues and to assist in the development of the project's *Waste Management Plan for the TSF-09/18 V-Tank and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10,* ICP 2004b) and the management of wastes generated by the project
- Assume responsibilities for WAG 1 waste streams and ensure that all activities in this process are completed.

1.2.10 Field Operations Manager

The field operations manager (FOM) represents the OU 1-10 organization at project site(s) with delegated responsibility for the safe and successful completion of all OU 1-10 project tasks (this statement does not detract from, nor relieve the facility manager of his responsibilities for safe conduct of activities in the facility). The FOM will manage tasks and ensure that the applicable field sampling plans, technical procedures, and other project-specific documents are executed properly. The FOM will report project status on a regular basis to the project manager. Additional responsibilities include, but are not limited to, the following:

- Ensuring that all field activities are conducted in compliance with technical procedures, work orders, and associated ISMS requirements
- Ensuring field team personnel comply with TCP project facility and operations requirements (as applicable)
- Obtaining and coordinating all resources needed to implement the fieldwork, including equipment, labor, and administrative and technical permits and approvals.

1.2.11 Field Team Lead

The field team leader (FTL) has ultimate responsibility for the safe and successful completion of activities associated with OU 1-10 V-Tank soil and treatment skid sampling. All health and safety issues at the V-Tank site for this work must be brought to the FTL's attention. In addition to managing field operations, executing the FSP as applicable, enforcing site control, documenting work site activities, and conducting daily safety briefings, the FTL's responsibilities include, but are not limited to the following:

- Enforcing task-site control, document activities, and conducting project-specific plan-of-the-day (POD) meetings and daily safety briefings at the start of each shift.

- Completing briefings and reviews in accordance with the requirements outlined in MCP-3003, "Performing Pre-Job Briefings and Post-Job Reviews." The FTL will complete the job requirements checklist in accordance with STD-101, "Integrated Work Control Process."

- Managing emergency and accident response and coordination.

- Conducting ESH&QA inspections.

- Ensuring compliance with waste management requirements and coordinating such activities with the environmental compliance coordinator or designee.

1.2.12 Task-Site Personnel

All task-site personnel shall understand and comply with the requirements of the project HASP (ICP 2004c). At the start of each shift, the FTL or HSO will conduct a planning meeting to discuss all daily tasks, associated hazards, hazard mitigation (e.g., engineering and administrative controls, required PPE, and work control documents), and emergency conditions and actions. During POD and prejob briefings, the project HSO, the IH, and the RCT will provide input as deemed appropriate to clarify health and safety requirements for the tasks. All personnel will be encouraged to ask questions regarding site tasks and to provide suggestions for performing required tasks in a more safe and effective manner in response to lessons learned from the previous day's activities.

Once at the site, all personnel are responsible for identifying any potentially unsafe situations or conditions to the FTL or HSO for corrective action. If an unsafe condition is perceived to pose an imminent danger, site personnel are authorized to stop work immediately and notify the FTL or HSO of the unsafe condition.

1.2.13 Nonfield Team Members/Visitors

All persons on the site who are not part of the field team (e.g., surveyor, equipment operator, or other craft personnel not assigned to the project) are considered nonfield team members or visitors for the purposes of this project. A person shall be considered "onsite" when that individual is present in or beyond the designated support zone. In accordance with 29 CFR 1910.120 and 1926.65, nonfield team members are considered occasional site workers and must:

- Check in with the facility shift supervisor in TAN-607

- Receive any additional site-specific training identified in the HASP (ICP 2004c) before entering beyond the support zone of the project site

- Meet all required training based on the tasks taking place, as identified in Section 4

- Meet minimum training requirements for such workers as described in the OSHA Standard (29 CFR 1910)

- Meet the same training requirements as the workers, if nonworker tasks require entry into the work control zone.

Training must be documented, and a copy of the documentation must be incorporated into the project field file. A site supervisor (e.g., HSO or FTL) shall supervise all nonfield team personnel who have not completed three days of supervised field experience in accordance with the Hazardous Waste Operations (HAZWOPER) standard (29 CFR 1910.120 and 1926.65).

1.2.14 Sampling Team Leader

The sampling team leader (STL) reports to the FTL and has ultimate responsibility for the safe and successful completion of assigned project tasks, including:

- Overseeing the sample team

- Ensuring that samples are collected from appropriate locations as directed by the FTL

- Ensuring that proper sampling methods are employed, chain-of-custody procedures are followed, and shipping requirements are met.

If the STL leaves the task site, an alternate will be appointed to act in his capacity. Acting STLs on the task site must meet all the same training requirements as the FTL as outlined in the project HASP (ICP 2004c). The identity of the acting STL shall be conveyed to task site personnel, recorded in the Sample Logbook, and communicated to the FTL, or designee, when appropriate.

1.2.15 Sampling Team

The sampling team will consist of a minimum of two members who will perform the onsite tasks necessary to collect the samples. The buddy system will be implemented for all tasks, and no team member will enter the contamination area alone. The members of the sampling team will be led by an STL who may also serve as the project FTL. The IH and RCT will support the sampling team as warranted in response to site-specific hazards and task evolutions.

1.2.16 Safety Engineer

The safety engineer (SE) reports to the ESH&QA manager and is responsible for:

- Reviewing work packages and observing work-site activity

- Assessing compliance with the INEEL *Manual 14B–Safety and Health Occupational Medical and Industrial Hygiene* (Safety and Health Department 2004)

- Signing safe work permits (SWPs) (INEEL Form 442.01)

- Advising the FTL on required safety equipment

- Answering questions on safety issues and concerns

- Recommending solutions to safety issues and concerns that arise at the work site.

The SE may conduct periodic inspections in accordance with MCP-3449, "Safety and Health Inspections," and have other duties at the work site as specified in other sections of the project HASP (ICP 2004c). Copies of the SE's inspections will be kept in the project field file.

1.2.17 Industrial Hygienist

The industrial hygienist (IH) reports to the ESH&QA manager and is the primary source of information regarding nonradiological hazardous and toxic agents at the work site. During any work operations involving either existing or anticipated chemical hazards to operations personnel, the IH will be present at the task site. Along with any additional duties at the task site specified in other sections of the project HASP (ICP 2004c), or company procedures and manuals, the IH is responsible for:

- Assessing the potential for worker exposures to hazardous agents in accordance with INEEL procedures and the INEEL *Manual 14B–Safety and Health Occupational Medical and Industrial Hygiene.*

- Assessing and recommending appropriate hazard controls for protection of work site personnel

- Reviewing the effectiveness of monitoring and PPE required in the project HASP (ICP 2004c) and recommending changes as appropriate.

Following any evacuation (if necessary), the IH will assist in determining whether conditions at the task site are safe for reentry. The IH, the HSO, and/or personnel supervisors will refer any personnel showing health effects resulting from possible exposure to hazardous agents to the Occupational Medical Program (OMP). During emergencies involving hazardous material, members of the Emergency Response Organization (ERO) will perform IH measurements.

NOTE: *The IH will review all employee job function evaluations (INEEL Form 340.02) to validate management completion of the form. After validation, the form will be sent to the OMP for the scheduling of a medical evaluation as needed.*

Table 1-1 lists the key points of contact for the Waste Area Group 1, Operable Unit 1-10 V-Tank field activities.

Table 1-1. Points of contact.

Name	Title	Telephone Number
Al Millhouse	Nuclear Facility Manager	(208) 526-6932
Kevin Streeper	Operations Manager/Nuclear Facility Manager	(208) 526-6151
Lisa Wolford	TAN SP-1 Project Manager	(208) 526-3050
Randy Sayer	TAN Clean Closure ESH&QA Manager	(208) 526-5706
Allen Jantz	WAG 1 Manager	(208) 526-8517
Jim Jessmore	V-Tanks Control Account Manager	(208) 526-7558
David Eaton	Regulatory Support	(208) 526-7002
Gary McDannel	WAG 1 Project Engineer	(208) 526-5076
Marshall Marlor	WGS Facility Representative	(208) 526-2581

Table 1-1. (continued).

Name	Title	Telephone Number
John Harris	WGS WAG 1 Waste Technical Specialist	(208) 526-3461
B. P. Shagula	Safety Engineer	(208) 526-0585
Kory Hatch	Industrial Hygienist	(208) 526-6312
Bruce Hendrix	Fire Protection Engineer	(208) 526-7989
Gary Lusk	Radiological Control Supervisor	(208) 526-4165
James Brady	Radiological Engineer	(208) 526-9747
Jim Rider	QA Engineer	(208) 526-2534
Tracy Elder	Sample Analysis Management	(208) 526-2076
Blake Burt	Field Operations Coordinator	(208) 526-3507
Dennis Myers	Field Team Leader	(208) 526-3081
Donna Haney	Sampling Team Leader	(208) 526-7050

ESH&QA = environmental, safety, health, and quality assurance
QA = quality assurance
TAN = Test Area North
WAG = waste area group
WGS = Waste Generator Services

2. WORK SITE BACKGROUND

This section provides an overview of the regulatory drivers at the work site, the location, and description of the V-Tanks and valve pits, and a review of sampling events.

2.1 Work Site Description and Background

2.1.1 Description and Historical Background

The INEEL is a U.S. government-owned test site managed by the DOE, and located in southeastern Idaho. In November 1989, the EPA placed the INEEL on the *National Priorities List of the National Oil and Hazardous Substances Pollution Contingency Plan* (54 Federal Register [FR] 48184) because of confirmed contaminant releases to the environment. In response to this listing, the Agencies, composed of the DOE, EPA, and the Idaho Department of Environmental Quality, negotiated an FFA/CO (DOE-ID 1991) and action plan. The FFA/CO and action plan were signed in 1991 by the Agencies, thereby establishing the procedural framework and schedule for developing, prioritizing, implementing, and monitoring response actions at the INEEL in accordance with CERCLA, the Resource Conservation and Recovery Act (RCRA), and the Idaho Hazardous Waste Management Act of 1983 (Idaho Statute, Title 39) (HWMA).

To better manage cleanup activities, the INEEL was divided into 10 waste area groups (WAGs). TAN is designated as WAG 1. In 1991, the FFA/CO (DOE-ID 1991) established 10 operable units (OUs) within WAG 1 consisting of 94 potential release sites (DOE-ID 1997). The sites include various types of pits, numerous spills, ponds, aboveground and underground storage tanks (USTs), and a railroad turntable. A comprehensive remedial investigation/feasibility study (RI/FS) was initiated in 1995 to determine the nature and extent of the contamination at TAN as documented in the *Comprehensive Remedial Investigation/Feasibility Study for the Test Area North Operable Unit 1-10 at the Idaho National Engineering and Environmental Laboratory* (DOE-ID 1997). The FFA/CO defines OU 1-10 as the comprehensive WAG 1 RI/FS (DOE-ID 1997), which culminated with the *Final Record of Decision for Test Area North, Operable Unit 1-10* (DOE-ID 1999) (ROD). Final remediation goals were established in the ROD based on long-term risks associated with Cs-137 activity. The following subsections describe the sampling events that have taken place at sites TSF-09, TSF-18, TSF-21, and around the demolished building TAN 615 before, during, and after the ROD was established.

2.1.2 Technical Support Facility-09, Tanks V-1, V-2, and V-3

The TSF Intermediate-Level (Radioactive) Waste Disposal System (TSF-09) is situated in an open area east of TAN-616 and north of TAN-607 as shown in Figures 2-1 and 2-2. TAN-616 will be removed prior to implementation of this FSP. TSF-09 consists of three USTs (V-1, V-2, and V-3), the contents of the tanks, associated piping, and the surrounding soil. These USTs are constructed of stainless steel, 3 m (10 ft) in diameter, 6 m (19.5 ft) long, buried approximately 3 m (10 ft) below grade, and have 50.8-cm (20-in.) manholes that are accessible through 1.8-m (6-ft) diameter culverts installed in 1981. These V-Tanks were installed in the early 1950s as part of the system designed to collect the following for treatment:

1. Radioactive liquid effluents generated in the hot cells, laboratories, and decontamination facilities at TAN

2. Waste from the Initial Engine Test Facility.

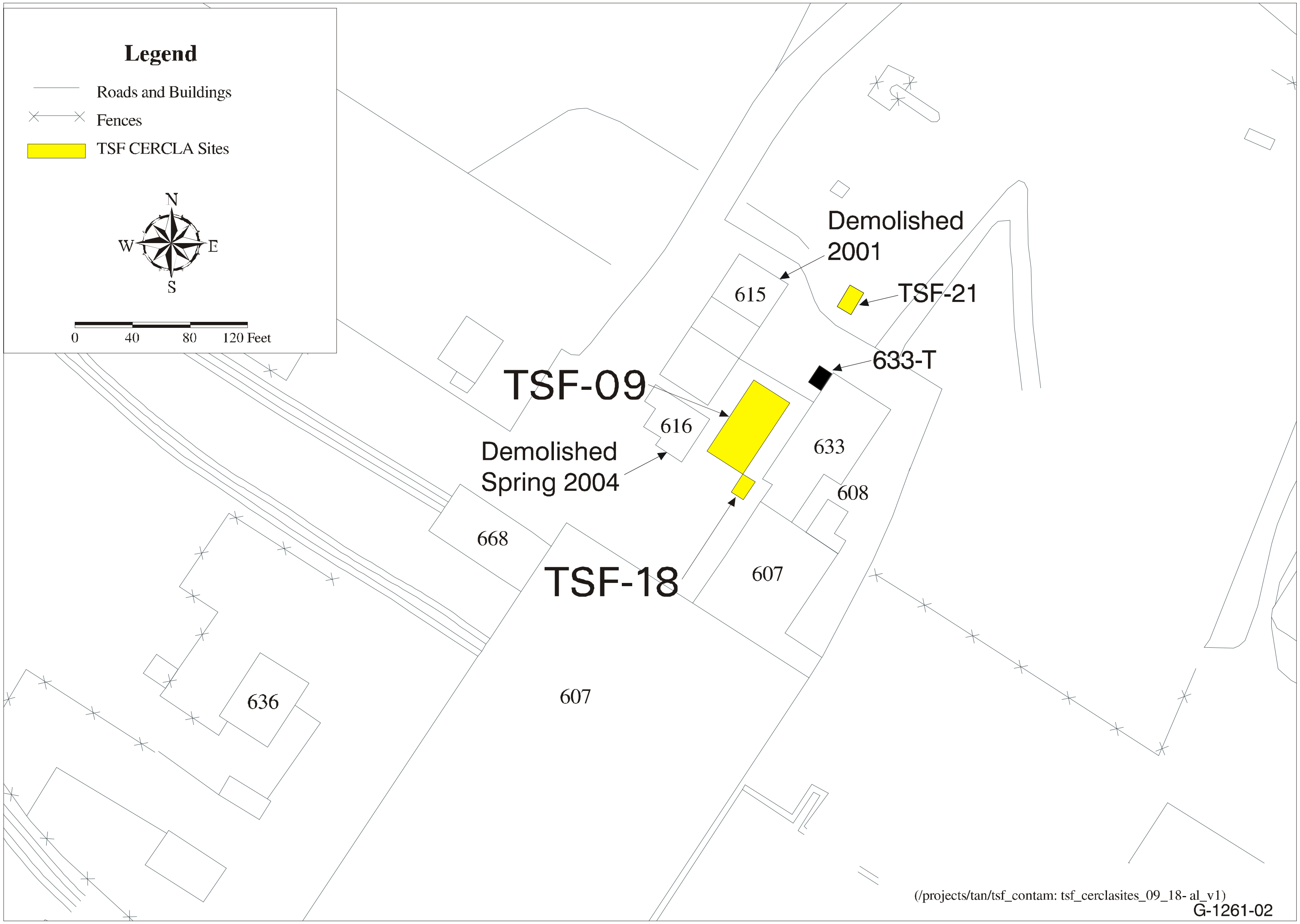

Figure 2-1. Locations of sites TSF-09, TSF-18, and TSF-21.

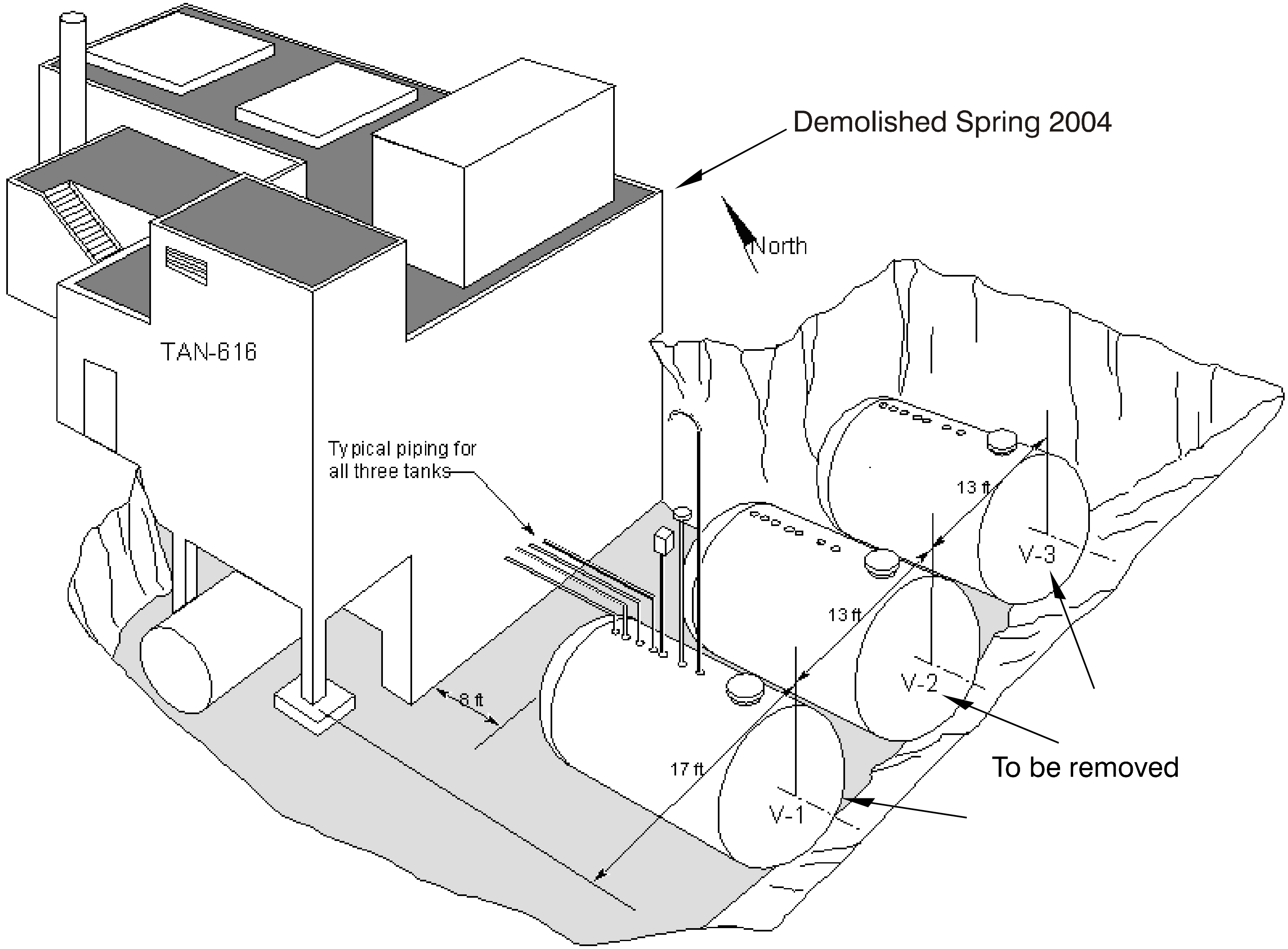

Figure 2-2. Diagram of Tanks V-1, V-2, and V-3 prior to remediation and demolition.

Based on environmental sampling, process knowledge, and work site use, the remedial investigation/feasibility study (RI/FS) (DOE-ID 1997) concluded that the known or suspected types of contamination at the work sites include metals (barium, cadmium, chromium, lead, mercury, and silver), volatile organic compounds ([VOCs] trichloroethene, 1,1,1-trichloroethane), semivolatile organic compounds (SVOCs) (Bis[2-ethylhexyl] phthalate), polychlorinated biphenyls (PCBs), and radionuclides (Cs-137, Co-60, Sr-90, and various isotopes of plutonium and uranium [DOE-ID 1997]). Since their installation, the three 37,850-L (10,000-gal) tanks have been used to store radioactive liquid wastes generated at TAN. Although the waste sent to the tanks was considered liquid, some oils and solids were also sent to the tanks, thereby creating two distinct phases (sludge and water). A Chemical Characterization report[d] (DOE-ID 2002, Appendix C) documents potential organic and inorganic contaminants for TSF-09. For Tanks V-1 through V-3, Table B-1 in Appendix B summarizes the potential contaminants within the V-Tanks.

The waste collected in the tanks was treated in the evaporator system located in TAN-616. Treatment residues were sent to the TSF injection well or the PM-2A tanks at TSF-26. After the evaporator system in TAN-616 was shut down in 1972, waste stored in the TSF-09 tanks was sent directly to the PM-2A tanks. After 1975, waste that had accumulated in the TSF-09 tanks was pumped out and shipped to the Idaho Chemical Processing Plant by tanker truck. Spills during tank operation and runoff from an adjacent cask storage pad reportedly contaminated surface soils surrounding the tank. In 1968, a large quantity of oil was discovered in Tank V-2, and the tank was taken out of service. The oil was removed from Tank V-2 in 1981, and the liquid in the three tanks (V-1, V-2, and V-3) was removed in 1982. During removal of the liquid, approximately 6,434.5 L (1,700 gal) were accidentally allowed to drain onto the ground. The liquid puddled in a soil depression along the west side of the tank manways and flowed north out of the radiologically controlled area through a shallow ditch. Cleanup operations removed approximately 3.8 m^3 (128 ft^3) of radioactive soil in a 0.9-m^2 (10-ft^2) to a depth of 4.2 m (13 ft) area north of the tanks and outside the posted RadCon zone, and the excavation was backfilled with clean soil. The tanks have not been used since the 1980s, although liquids (i.e., rainwater and snowmelt) have accidentally accumulated in Tank V-3 since the 1980s (DOE-ID 1997).

2.1.3 Technical Support Facility-18, Tank V-9

The V-9 contaminated tank (TSF-18) is situated in an open area east of TAN-616 and north of TAN-607, as shown on Figure 2-1. TSF-18 consists of one UST, the tank contents, associated piping, and the surrounding soil.

The tank at TSF-18, referred to as Tank V-9 (see Figure 2-3), is a 1,514-L (400-gal) stainless steel sump tank located approximately 2.1 m (7 ft) to 4.2 m (14 ft) below ground surface. Tank V-9 is a vertical, cylindrical tank with a conical shaped bottom. It has a 1.07 m (42 in.) diameter through the cylindrical portion for 1.7 m (5.5 ft), and then tapers down another 53.3 cm (21 in.) through the conical section. Tank V-9 is accessible by a 15.2-cm (6-in.) diameter riser that extends to the ground surface. Blackmore (1998) estimated that the total volume of material in Tank V-9 was 1,216 L (320 gal). Radiation readings in the tank range from 9 mrem/hr on contact just inside the 15.2-cm (6-in.) riser to 10,500 mrem/hr just inside the tank. The tank was installed in the early 1950s and was indicated as a sump tank in “as-built” facility drawings. The visual evidence collected during the remedial investigation is consistent with the tank configuration shown in earlier “as-built” drawings (DOE-ID 1997). The internal visual evidence obtained with a remote camera during the remedial investigation also indicates that the tank is in good condition (DOE-ID 1997).

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d. The report also clarifies that several VOC and SVOC constituents were not detected in the waste; however, detection limits exceeded either regulatory limits and/or applicable land disposal restriction (LDR) treatment standards. In this case, these constituents could not conclusively be eliminated as not being present in the waste. Therefore, this characterization has assumed these constituents to be present in the waste at the detection limit value or concentration.

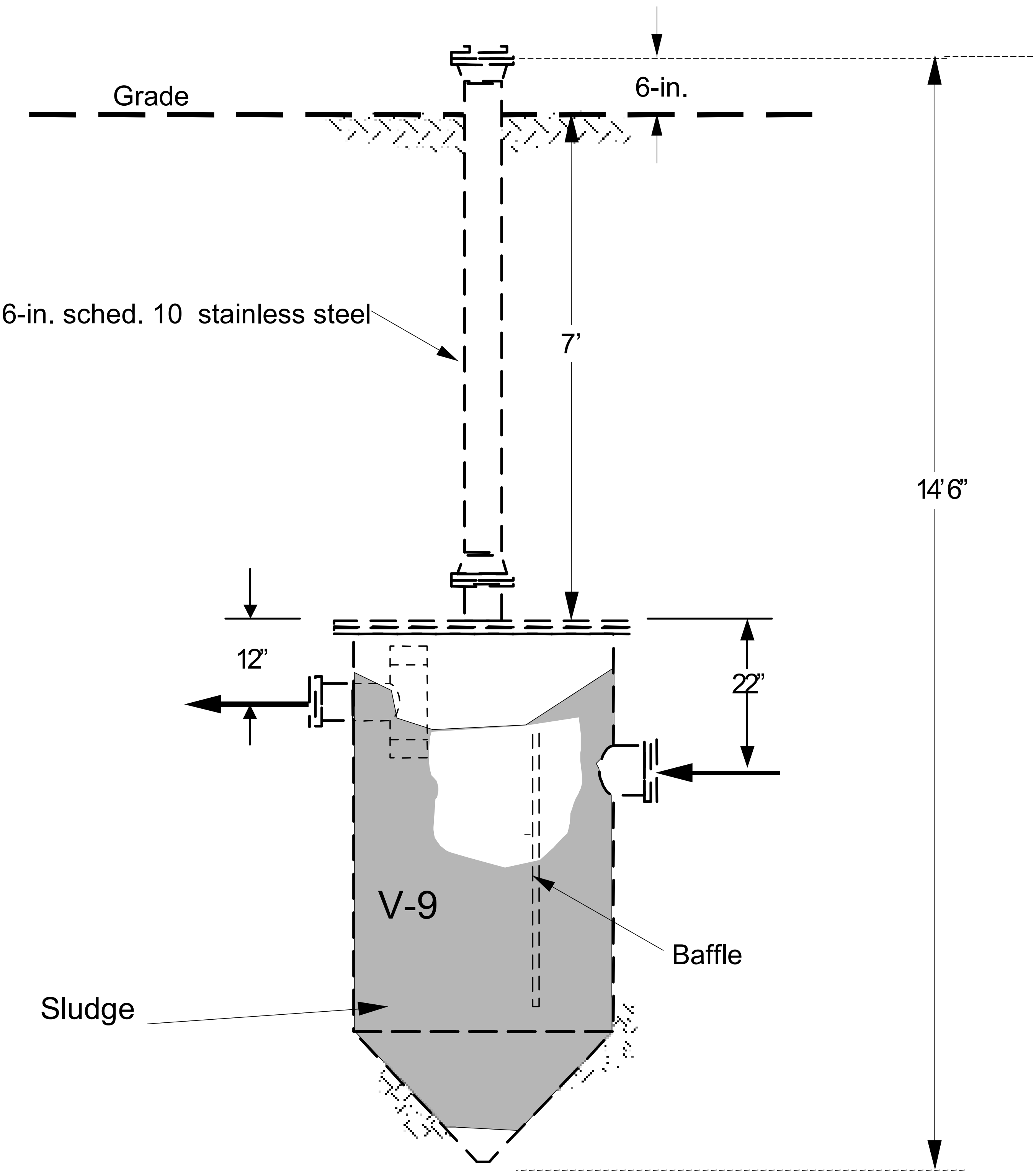

Figure 2-3. Diagram of Tank V-9.

Results from sampling and analysis of Tank V-9 contents performed during the remedial investigation indicate that chemicals in the tank are very similar to those found in the tanks at TSF-09. High concentrations of Sr-90, Cs-137, Co-60, and trichloroethene detected during analysis are consistent with those found in the TSF-09 tanks during the Track 2 investigation in 1993 (INEL 1994). The Chemical Characterization Report (DOE-ID 2002, Appendix C) documents potential organic and inorganic contaminants for Tank V-9. Table B-1 in Appendix B summarizes these potential contaminants in two separate phases within this tank.

The volumes of liquid and sludge in each of the V-Tanks is given in Table 2-1 (INEEL 2003b).

Table 2-1. Volumes of residual material in V-Tanks.

Tank	Capacity (gal)	Liquid Volume (gal)	Sludge Volume (gal)	Total Waste Volume (gal)
V-1	10,000	1,164	520	1,684
V-2	10,000	1,138	458	1,596
V-3	10,000	7,660	652	8,312
V-9	400	70	250	320
Total for V-Tank	30,400	10,032	1,880	11,912

2.1.4 TAN 615 Dog Leg

The data for the surface measurements around the demolished Building 615 were plotted for Cs-137 (the COC for the V-Tank area). Figure 1-3 depicts the area around TAN-615 that denotes surface areas where Cs-137 has concentrations in excess of 23.3 pCi/g. While the area in the figure is considered to help define the contaminated area, potential gamma interference may exist from a temporary storage area containing radioactively hot waste samples where Building TAN-615 once stood. According to the project field team leader, the sampling team indicated that there might be an influence of “radioactive shine” as a result of this storage area (i.e., a false positive of a Cs-137 source emanating from the soil). This assertion is supported from gamma data taken from a vertical borehole well SS-08 located adjacent to the old building. The data for this well at 6 in. below the surface produced a reading of 0.6 pCi/g, the largest source term value in this well. The location of SS-08 would put it in next to the old TAN-615 as predicted by the surface readings. However, prior to the initiation of confirmation sampling in the Phase 3 excavation footprint, potential sources of “radioactive shine” will be removed to the extent possible.

2.1.5 633 T

During 2003 D&D operations an area was found to have contamination from a probable leak. The area was at a piping tee from an underground waste pipe from building TAN-633 that joins into the pipeline connecting Valve Pit #1 and #2. The area is located adjacent to the V-Tank excavation area on the Northeast side and its dimensions are 10 m (33.1 ft) by 9.3 m (30.5 ft) (93 m^2 [1001 ft^2]). The maximum depth of the excavation is bounded to a depth of 3 m (10 ft).

2.2 Previous Soil Investigations-V-Tanks and TSF-21

Numerous soil investigations have taken place in the area of concern to identify sources of soil contamination. These investigations are identified in *TSF-09/18 Calendar Year 2003 Early Remediation Action Activities Summary Report for Waste Area Group 1, Operable Unit 1-10* (ICP 2004a).

3. SAMPLING OBJECTIVES FOR IDENTIFYING SOIL CONTAMINATION LEVELS IN THE AREA OF CONCERN

Soils within the upper 10 ft in the area of contamination identified in Figure 1-2 with a radiological contamination of greater than 23.3 pCi/g of Cs-137 and other potential FRGs will be excavated after V-Tank removal. If radiological contamination is greater than 23.3 pCi/g of Cs-137 or staining of the soil is observed at depths greater than 10 ft, excavation will continue until the radiological contamination reduces to below the level of concern, the reach limit of the excavation equipment is reached, or other mitigating factors preclude further excavation. Samples will be taken to validate that FRGs have been met.

3.1 Data Needs

The overall objective of this FSP is to confirm soil remaining at the V-Tank area of contamination to ensure that it meets the criteria identified above. The data will be used to identify the level of contamination in the remaining soils after tank excavation and the removal of identified hot spots. Excavated soils will be stockpiled or bagged prior to characterization and disposal at the ICDF (DOE/NE-ID 2004). The DQO process, used to justify sample numbers and sample location of the soils underneath the V-Tanks, TSF-21, and other known leak locations, is detailed in the RCRA Sampling Plan (INEEL 2003a). Samples of the GAC and HEPA filter on the off-gas system of the V-Tank treatment process will also be obtained for disposal purposes.

The DQO process has been used for these sampling activities and is described in Section 3.2. As qualitative and quantitative statements, the DQOs help to ensure that collected data are of sufficient quality and quantity to achieve the objectives established in this FSP.

The criteria for measurement data are expressed as quality assurance objectives (QAOs). The measurement QAOs are specifications that data must meet to comply with project needs specified by DQOs. The specific QA parameters of interest are defined as quantitative QA parameters (precision, accuracy, method detection limit [MDL], and completeness) and qualitative parameters (representativeness and comparability). The QAOs are described in Section 3.3.

This FSP is used in conjunction with the QAPjP (DOE-ID 2004a) to present the functional activities, organization, and QA/QC protocols necessary to achieve the specified DQOs. Together, the QAPjP and this FSP constitute the SAP for OU 1-10, Group 2 Site, TAN V-Tanks remediation soil and treatment process sampling activities.

3.2 Data Quality Objectives

In order to ensure that the data for this project are of sufficient quality and quantity to support defensible decisions, the process of collecting and analyzing data must be scientifically defensible. The sampling process is discussed in the context of DQOs, as defined by the “Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs” (EPA 1994). The concept of DQOs was developed by the EPA to establish a process for defining the data needed to make defensible decisions involving the study, design, and cleanup of hazardous waste sites, and to ensure that the type, quantity, and quality of data used in decision-making are appropriate for the intended application. The goals of the DQO process are technical adequacy (technically sound deliverables), defensibility, consistency in approach and documentation, and cost-effectiveness.

The DQO process includes seven steps. The seven-step process is a highly structured, tactical approach to implementing the overall DQO process, and each of the seven steps has a specific output. The output from each step influences the choices that will be made later in the process. In order for the seven-step DQO process to be effective, steps must be performed in the proper order, inputs must be based on comprehensive scoping and maximum participation/contributions by decision-makers, and sample design must be based on the severity of the consequences of decision error. Even though the DQO process is depicted as a linear sequence of steps, in practice it is iterative (i.e., the outputs from one step may lead to a reconsideration of prior steps). This iteration is encouraged since it will ultimately lead to a more efficient data collection design.

The DQO process for determining the number and locations of samples for the RCRA sampling is identified in the RCRA Sampling Plan (INEEL 2003a).

3.2.1 Problem Statement

The first step in the DQO process is to clearly and concisely state the problem to be addressed for the soils in the area of concern. The concise problem statement describes the problem as it is currently understood, and the conditions that are causing the problem. Prior studies and existing information are reviewed to gain a sufficient understanding to define the problem. The appropriate outputs for this step are a concise description of the problem, a list of the planning team members, identification of the decision-maker(s), and a summary of available resources and relevant deadlines for the study. The planning team members and decision-makers are identified in Section 1.2. The schedule for soil removal and site closure activities is presented in the *Record of Decision Amendment for the V-Tanks (TSF-09 and TSF-18) and Explanation of Significant Differences for the PM-2A Tanks (TSF-26) and TSF-06, Area 10, at Test Area North, Operable Unit 1-10* (DOE-ID 2004c).

The V-Tanks and related piping will be excavated, isolated, capped, and removed. The tank contents and, therefore, the piping are contaminated with radionuclides, heavy metals, organic compounds, and polychlorinated biphenyls (PCBs). Since releases at these and nearby sites may pose an imminent and substantial endangerment to human health and the environment, the *Final Record of Decision for Test Area North, Operable Unit 1-10* (DOE-ID 1999) specifies that contaminated soils above regulatory limits will be removed. Contaminated soils in the area of concern will be excavated if the radiological contamination is greater than 23.3 pCi/g of Cs-137 and/or staining of the soil is observed. After excavation of the contaminated soil (verified using a High Purity Germanium Detector), sampling and analysis of the soil will be conducted on the remaining soils to determine if further excavation is required. Therefore, the problem statement is:

- A risk analysis will be conducted on residual RCRA contaminant levels to determine new final remediation goals (FRGs) for the area of concern. Have these new FRGs been achieved in the remaining soils?

3.2.2 Identification of Decisions

The primary objective of Step 2 in the DQO process is to develop an accurate and comprehensive decision statement (DS) that addresses the concerns highlighted in the problem statement. This includes identifying questions that the study will attempt to resolve, and what actions may result or be affected by the data collected. This is done by specifying a principal study question (PSQ), identifying alternative actions (AAs) that could result from resolution of the PSQ, and combining the PSQ and AAs into a DS.

The PSQ pertaining to the problem statement is:

- PSQ: Does the remaining soil after excavation have radiological contamination greater than 23.3 pCi/g of Cs-137?

The AAs to be taken, depending on the resolution to the PSQ, are as follows:

- AA1a: If radiological contamination above 23.3 pCi/g of Cs-137 is identified, the soil will be removed and placed on a staging stockpile, or in soil bags, prior to disposal at the ICDF.

- AA1b: If radiological contamination is below 23.3 pCi/g of Cs-137, samples will be taken and analyzed to determine if the FRGs have been met. Sampling from beneath the V-Tanks under the associated RCRA Corrective Action (DOE-ID 2004e) will be used to perform a risk analysis and to determine these FRGs. If the FRGs have been met, then no further action will be required with regard to the soils. If the risk analysis determines that the final remediation goals have not been met, additional soil will be excavated with further sampling and analyses until the FRGs have been met, unless mitigating factors preclude further excavation.

Combining the PSQ and AAs results in the following DS:

- DS: Determine if all constituents above the FRGs have been excavated.

3.2.3 Identification of Inputs to Decisions

Decision inputs are the parameters required to resolve the DS and to determine if the decision requires environmental measurements. The information needed to resolve the DS listed above is the identification of all contaminants of concern associated with the soils. Existing data for the concentrations of hazardous constituents present in the waste contained in the collecting tanks (V-1, V-2, and V-3) and the sump tank (V-9) are relevant to this study because they provide the minimum list of constituents for which analyses should be performed. The existing data cannot be used to determine if a release has occurred as these data were collected to characterize the material within the tank system. However, sampling and analysis of the soil underneath the tanks concerning RCRA closure of the tanks will characterize the soil identified in this FSP. Another source of information comes from historical process knowledge of tank operations. This information further defines the list of constituents for which analysis data are required.

During this step of the DQO process, the basis for an action level is established. The action level is the threshold value that provides the criterion for choosing between AAs. Action levels may be based on regulatory thresholds or standards, or they may be derived from problem-specific considerations such as risk assessments.

Biased and unbiased samples will be collected in accordance with the sampling design given in Section 4, and will be analyzed for the constituents specified in Section 4. Cesium-137 at levels in excess of the FRG (23.3 pCi/g) will be the indicator of the presence or absence of contamination that exceeds FRGs.

3.2.4 Definition of Study Boundaries

During Step 4, the spatial and temporal boundaries to which decisions will apply in order to clarify the sample domain are defined. The spatial boundaries simply define the physical extent of the study area and may be subdivided into specific areas of interest. The temporal boundaries define the duration of the study or specific parts of the study. The outputs of this step are a detailed description of the spatial and temporal boundaries of the problem and a discussion of any practical constraints that may interfere with the study.

For the soils surrounding the V-Tank and TSF-21 sites, the spatial boundaries include the soil area identified in Figure 1-2.

3.2.5 Development of Decision Rules

Step 5 combines Steps 1 through 4 to produce four elements to form decision rules: the statistical parameter of interest, scale of decision-making, action level, and AAs. It integrates the previous DQO outputs into a single statement that describes the logical basis for choosing among AAs.

The decision rule is an "if . . .then . . ." statement, describing the action to take if one or more conditions are met that combines the parameter of interest, the scale of decision-making, the action level, and the action(s) that would result from resolution of the decision.

The decision rules associated with the soils in the V-Tank area are:

- **If** the confirmation sampling of soils show an activity level greater than 23.3 pCi/g of Cs-137, **then** the soils will be excavated and placed on a staging stockpile or in soil bags to await disposition.

- **If** the confirmation sampling of soils show an activity level greater than 2.3 pCi/g of Cs-137, **then** determine if institutional controls are necessary.

- **If** the risk assessment that uses RCRA confirmation sampling does not show the need for additional FRGs, **then** conduct CERCLA confirmation sampling (otherwise, consult with the Agencies regarding the need for an alternative sampling approach).

The decision process and development of decision rules is detailed schematically in Figure 1-1.

3.2.6 Specification of Limits on Decision Errors

Since analytical data can only provide an estimate of the true condition of a site, decisions that are based on such data potentially could be in error. The purpose of Step 6 is to minimize uncertainty in the data by defining tolerable limits on decision errors that are used to establish performance goals for the data collection design.

The decision-maker must define acceptable limits on the probability of making a decision error. The possibility of decision error cannot be eliminated, but it can be minimized by controlling the total study error. Methods for controlling total study error include collecting a sufficient number of samples (to control sampling design error), analyzing individual samples several times, or using more precise analytical methods (to control measurement error). Therefore, it is necessary to determine the possible range for the parameter of interest and to define both the types of decision errors and the potential consequences of the errors.

The two types of decision errors that could occur with regard to the soils at the V-Tank sites are:

- Determining that soil contamination is not present in the area of concern when, in fact, contamination is present, would result in the assumption that the soils in the area of concern are not contaminated and do not require excavation. This may result in CERCLA compliance issues and failure to protect human health and the environment. This wrong decision is generally referred to as a Type I error or a false positive error.

- Determining that soil contamination is present when, in fact, contamination is not present, would result in collection of unnecessary additional samples to characterize the soils, resulting in further expense of project resources to complete unnecessary activities and the potential for the generation of unnecessary waste in the form of unnecessary soil removal activities. This wrong decision is generally referred to as a Type II error or a false negative error.

This field plan calls for a recommended minimum confidence level of 90% for Type I errors (false positive) and the minimum compliment of the power is 80% for Type II (false negative).

3.2.7 Optimization of Investigation Design for Obtaining Data

The purpose of design optimization in the DQO process is to evaluate information from the previous steps, generate alternative data collection design options that will provide the data needed for the desired analysis, and select the most resource-effective design that meets all DQOs. The activities involved in design optimization include:

- Reviewing the outputs of the first six steps and existing environmental data

- Developing general data collection design alternatives

- Formulating a mathematical expression needed to solve the design problem for each data collection design alternative

- Selecting the optimal number of samples to satisfy the DQOs for each data collection design alternative

- Selecting the most resource-effective data collection design that satisfies all the DQOs.

It was determined that rather than randomly sample a select number of samples from selected grid cells that it would be more effective to use a portable gamma scan detector and scan the entire area of interest. The gamma scans will be accomplished with a 50% high purity germanium detector. The detector has an adjustable platform that allows for a variable field view. The detector can be raised up to 3 ft above surface for a maximum range of 50 ft in diameter. At that level, the detector has a detection level of about 0.5 pCi/g of Cs-137 on a 30-minute count time with approximately a 2% standard deviation. This will be sufficient for the 100% scanning for surface level contamination and identifying any residual hotspots. Each of the areas, the excavated area, the tank laydown area, below the soil staging stockpile area, and downwind of the staging stockpile area, will be sectioned by a 35 × 35 ft grid. Every grid cell will be sampled with the field gamma scan detector. The four areas will be analyzed separately because of the likely possibility of different time frames for final analysis.

In addition to the above verification sampling, additional sampling will be performed under this FSP that follows the RCRA Sampling Plan (INEEL 2003a). The RCRA Sampling Plan calls for four biased samples to be taken below the centerline of each V-Tank near its sump and an additional four unbiased samples to be taken at random locations in the excavated footprint for V-tanks. Three unbiased samples will be taken at random locations from the base of the excavated Valve Pit 2 (TSF-21) area. The random selection was performed using a system supplied random number generator that is based on the system clock selecting from a uniform distribution. A single soil sample will be collected from each of the 633 T excavation area and the TSF-21 cut pipe area. These samples will undergo the full suite of analyses identified in Section 5 (See Table 5-2). All these samples will be tested against the limit of 23.3 pCi/g of Cs-137 at a 95% confidence level to determine that the contamination is under the limit. A risk analysis will be conducted on the results of the RCRA sampling and analysis effort to determine if further FRGs are necessary.

Each soil sample will consist of a composite soil sample containing a set of subsamples all taken from the top 6 in. of surface soil. A composite soil sample consists of several subsamples that are thoroughly mixed together to create one sample for analysis. A minimum of 18 subsamples should be collected for each composite sample to adequately characterize the soil conditions. All subsamples used to create a given composite sample must be collected from the same 6-in. depth interval. It is important that the subsamples not be collected over different vertical intervals. Because of the inherent nonhomogeneity of soil, a composite sample is better for getting a more representative sample of the general soil characteristics with less variability than a single collection sample.

Taking a representative composite sample is a cost-effective way to obtain reliable field characterization data, but a minimum number of subsamples should be collected to make a composite sample to account for soil variability. Most laboratories suggest 15 to 20 subsamples to form a composite sample. This is because field variability is adequately represented when the number of cores reaches about 18. All subsamples shall be taken randomly from the sampling unit, but the subsample sites shall be distributed throughout the entire sampling unit.

The usual goal of a sampling plan is to obtain as precise an estimate of the treatment means as possible with as few samples as possible. In soil sampling that usually means as few composite samples as possible to keep the cost of analyses down and as few subsamples per sample as possible to limit the field work. Thus, these questions are closely related, so we will consider them together.

The more subsamples that are taken, the lower the variability between samples which gives a more precise estimate of the treatment mean. Generally, it is more cost effective to collect more subsamples and composite them than have more composite samples being analyzed. Figure 3-1 shows the relationship between the variance of the mean value and the number of subsamples and the number of composites. There is a relatively small decrease in the estimated variance between 3 composite samples and 5 composite samples. Furthermore, after 18 subsamples, the decrease in variability is small. This suggests that the optimum number of composites would be 3 and the number of subsamples would be 18 (Baldock et al. 1994).

Therefore, for each of the composites collected for this sampling plan a minimum of 18 subsamples will be taken. However, through negotiations, 4 composites will be taken for the biased sampling along the centerline for each tank near its sump and for the 4 unbiased samples taken in the footprint area of the tanks. Three composites will be taken for the Valve Pit 2 (TSF-21) area. A single sample will be taken from the soil at the end of the cut pipe and for the 633 T Area because of the small areas to be sampled.

All subsamples will be collected in a collection vessel. After the collection of all 18 subsamples the actual composite sample will be extracted through the random collection of 30 samples from the collection vessel. This should supply a better composite sample than mixing the collection of subsamples and collecting a composite sample from this sample because mixing tends to increase segregation rather than decrease it ("Improving Laboratory Performance through Scientific Subsampling Techniques" by [Ramsey and Suggs, 2001]).

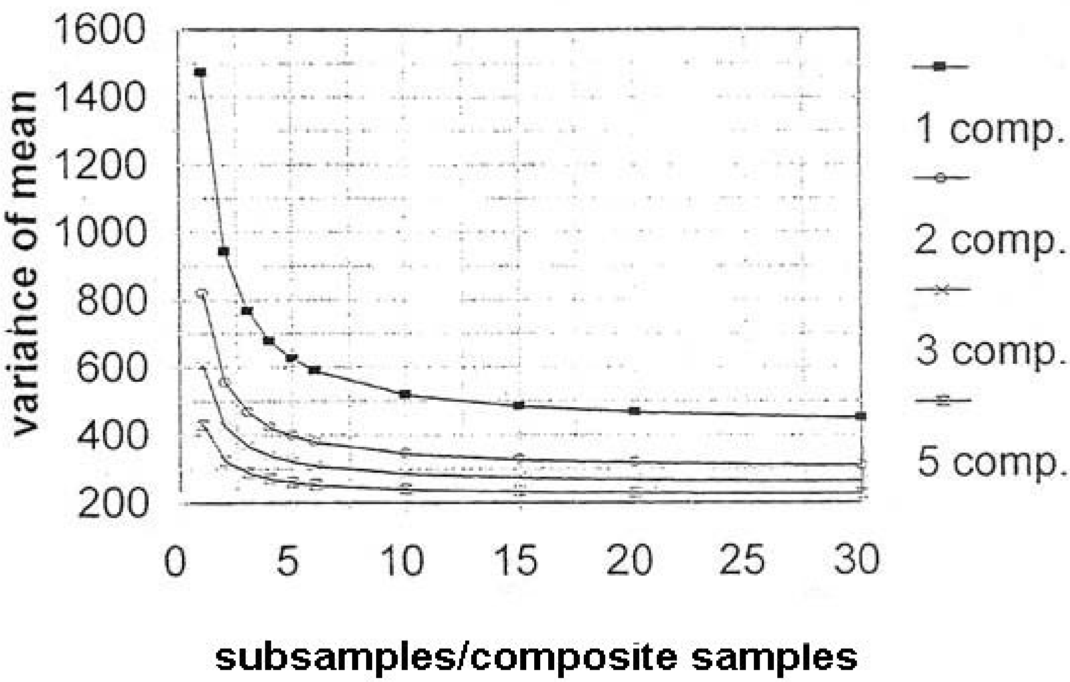

Figure 3-1. Chart shows the relation between the variance of the treatment mean and the number of composite samples and subsamples.

Three composite samples should be adequate to estimate the average with a small enough variability to test the results against the limits. The average value represents the true estimate of the contaminant of concern and is usually the value tested against the limits as specified in SW-846, which is EPA's guideline for evaluating solid wastes (EPA SW-846 Chapter 9, pg 13). If the average of the sample results is below the limit but within the 95% confidence limit, then more samples may be necessary to quantify if the average is sufficiently below the limit to satisfy the DQOs.

The samples to be taken under the direction of this CERCLA Sampling Plan are listed in Table 3-1.

3.3 Quality Assurance Objective for Measurement

The QA objectives for measurement will meet or surpass the minimum requirements for data quality indicators established in the QAPjP (DOE-ID 2004a), which provides minimum requirements for the following measurement quality indicators:

- Precision
- Accuracy
- Representativeness
- Completeness
- Comparability.

Table 3-1. CERCLA and RCRA samples to be collected for the TAN V-Tank remediation project.

Item	Location	Number and Type of Samples		Analysis	Requiring Document	Notes
		RCRA	CERCLA			
1	Under each V-Tank Sample taken at centerline of each tank near sump (biased)	4		Full Suite[a]	RCRA FSP, page 3-9	Supports risk analysis
2	Random samples under tanks (unbiased)	4		Full Suite[a]	RCRA FSP, page 3-11	Supports risk analysis
3	Sample areas that show evidence of release (biased)	If needed		Full Suite[a]	RCRA FSP, page 3-10	Supports risk analysis
4	Valve Pit 2 TSF-21 (unbiased)	3*		Full Suite[a]	RCRA FSP, page 3-12 and ROD Amendment, Table 11-2	Supports risk analysis
5	Phase 3 excavation footprint		18	Wide area survey[c] and FRG[b]	ROD Amendment, Table 11-2.	Wide area survey over entire area. This sampling also needs to target any new identified FRGs.
6	Soil at end of cut pipe (biased)	1		Full Suite[a]	RCRA FSP, page 3-10 ROD amendment, Table 11-2	Supports risk analysis Carbon steel pipe, evidence suggests possible release. Wide area survey for this item is addressed in Item 5.
7	Tank laydown area		4	Wide area survey[c] and FRG[b]	ROD Amendment Table 11-2	Note that although the ROD did not require other FRGs, it is conceivable that the exterior of the tanks could contain other FRGs if the tanks leaked. Therefore, this sampling also needs to target the FRGs.
8	Dog-leg area		1	Wide area survey[c]	ROD Amendment Table 11-2	Evidence suggests surface contamination only, i.e., no evidence of V-Tank contents spilled here. Evidence suggests Cs-137 presence.
9	633 T (biased)	1*		Full Suite[a]	ROD Amendment Table 11-2	Supports risk analysis. Because of evidence of release, we will have to do full suite analysis in accordance with the ROD that passes responsibility back to RCRA Closure. Wide area survey for this item is addressed in Item 5.

Table 3-1. (continued).

Item	Location	Number and Type of Samples		Analysis	Requiring Document	Notes
		RCRA	CERCLA			
10	Below staging stockpile		9	Wide area survey[c] and FRG[b]	ROD Amendment Table 11-2	Note that although the ROD did not require other FRGs it is conceivable that the excavated soil could contain another FRG contaminant if the tanks have leaked. Therefore, this sampling also needs to target FRGs.
11	Downwind of staging stockpile		As needed	Wide area survey[c] and FRG[b]	ROD Amendment Table 11-2	Note that although the ROD did not require other FRGs it is conceivable that the excavated soil could spread contamination to this area via wind, then this windblown are could also contain another FRG contaminant. Therefore, this sampling also needs to target the FRG short list, not just Cs-137
12	GAC		1	Secondary waste characterization[d]		Composite sample of GAC
13	HEPA		1	Secondary waste characterization[e]		Composite sample of HEPA filter
14	Discretionary samples (If necessary and as designated by FTL in consultation with Project Engineer and Health Safety Officer)		If necessary and as designated by FTL in consultation with Project Engineer [f]	Full Suite [a] Wide area survey [c, f]		These samples are intended to address the potential need for sampling in areas that may be identified during the other sampling activities.

a. Full suite: As detailed in the RCRA FSP (INEEL 2003a), full suite analysis includes the following analysis types:

Am-241	PCBs
CLP Metals	Pu-isotopic
Cm-isotopic	Radium-226
Cyanide	SVOC (CLP TAL)
Fluoride	Sr-90
Gamma Spectroscopy	Tritium
Iodine-129	U-isotopic
Ni-63	VOC (CLP TAL)
Np-237	

b. FRGs. The final remediation goals (FRGs) include Cs-137 and any additional contaminant that could cause the remedial action objectives to not be reached. These additional contaminants are determined through a CERCLA risk-analysis process.

c. Wide area survey: with High Purity Ge spectrometer.

d. Waste characterization analysis includes TCLP analysis for VOC and SVOCs. Gamma spectroscopy,

e. Waste characterization analysis includes TCLP analysis for metals. Gamma spectroscopy.

f. Full Suite analysis and wide area survey may both be taken at the discretion of the FTL in consultation with the Project Engineer if the situation observed during other field sampling activities indicates the need for additional sampling. This sampling item is intended to address the need for a minor sampling and is not intended to be a significant expansion of the overall sampling campaign. See Section 4.1.10 for additional discussion.

* Supports both RCRA and CERLA requirements.

Precision, accuracy, and completeness will be calculated in accordance with the QAPjP (DOE-ID 2004a). Representativeness and comparability will be promoted by the sampling design, the collection of samples using similar sampling techniques to previous efforts, and the use of the same analytical techniques as previous efforts. By promoting representativeness and comparability in this manner, the previous data set can be supplemented with the new data collected under implementation of this FSP.

Spatial variations are present in concentrations of contaminants at a site, creating sampling variability. Additional variability occurs during sample collection, handling, processing, analysis, quality evaluation, and reporting. While the variability associated with sampling cannot be eliminated, it can be minimized by using the DQOs, as given in Section 3.2, and obtaining QA samples, such as duplicate samples, field blanks, and rinsate samples. To ensure that data collected are sufficiently accurate and consistent with the DQOs, the following parameters will be used for assessing the quality of the measurement data.

3.3.1 Precision

Precision is a measure of the reproducibility of measurements under a given set of conditions. It is a measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions, and expressed generally in terms of standard deviation. In the field, precision is affected by the natural heterogeneity of the material being sampled and by sample collection procedures.

Overall precision (field and laboratory) can be evaluated by the use of duplicate samples collected in the field. Greater precision is typically required for chemicals with very low action levels that are close to background concentrations.

Laboratory precision requirements are part of the validation criteria against which laboratory data are evaluated. Laboratory precision is estimated through the use of duplicates, spiked samples (i.e., matrix and/or surrogate spikes), and/or laboratory control samples (LCSs). Laboratory precision will be evaluated during the method data validation process. The number of laboratory QC samples is specified in the analytical methods used and in the SAM SOW (or task order SOWs). Evaluation criteria for the QC samples are specified in the SAM data validation technical procedures (TPRs).

The precision of the wide-area scan is $\pm$ 1-3% at 2 sigma.

3.3.2 Accuracy

Accuracy is a measure of bias in a measurement system. It is the closeness of agreement between the measured value and the true value and is calculated as %R. Sample preservation and handling, field contamination, and the sample matrix in the field affect overall accuracy. The effects of these three parameters can be assessed by evaluating the results of field blanks and equipment rinsates (i.e., equipment blanks). Field blanks are collected and analyzed to determine the level of contamination, if any, introduced into the sample during field sampling activities. They consist of the same water used for equipment decontamination. A rinsate is a sample of analyte-free water poured over decontaminated sampling equipment and is designed to detect any residual contamination on the equipment.

Laboratory accuracy requirements are part of the validation criteria against which laboratory data are evaluated. Laboratory accuracy is assessed through the use of matrix spikes, laboratory control samples, and blind QC samples, and will be evaluated during the method data validation process. The number of laboratory QC samples is specified in the analytical methods used and in the SAM SOW (or task order SOW). Evaluation criteria for the laboratory QC samples are specified in the SAM data validation TPRs.

Field accuracy will be determined for samples collected for laboratory analysis. The requirement for equipment rinsate samples states that equipment rinsates will be collected whenever there is a change in the sample collection procedures, sample decontamination procedures, sampling equipment, or sample collection personnel. The equipment rinsate samples will be collected (at a minimum) at the initiation of sampling at the V-Tank areas of concern and at the conclusion of sampling at the V-Tank areas of concern. The number of field and equipment blank samples is subject to change based on the field conditions and sampling efficiency.

In situ gamma scan accuracy for tripod-based wide-area scans is ± 5% based on comparison to absolute field calibration pad values that have been measured at Grand Junction, Colorado.

3.3.3 Representativeness

The objective of representativeness is to assess whether information obtained during the investigation accurately represents actual site conditions. Representativeness is a qualitative parameter that expresses the degree to which the sampling and analytical data accurately and precisely reflect the characteristic of a population, the parameter variations at a sampling point, or an environmental condition (EPA 1988). Representativeness addresses the proper design of the sampling program implemented by the FSP. This criterion is satisfied by confirming that sampling locations are selected properly, a sufficient number of samples are collected, and an appropriate sampling technique is employed to meet the confidence level required by the intended use of the data. Variations at a sampling point will be evaluated based on the results of field duplicates.

For the purposes of the V-Tank sites sampling, good representativeness will be achieved through careful, informed selection of sampling sites and analytical parameters, through collection of a sufficient number of samples to assess the confidence level of the data with respect to its intended use, and through the proper collection and handling of samples to avoid interferences and to minimize contamination and loss. Section 3.2 of this FSP describes the DQOs used to select sample locations and number of samples.

3.3.4 Completeness

Completeness is a measure of the quantity of valid data collected during an investigation compared to the amount expected to be obtained under correct, normal conditions. It is a quantitative evaluation of what percent of the chemical measurements meet the project DQOs. The QAPjP (DOE-ID 2004a) requires that an overall completeness goal of 90% be achieved during an RI/FS. For all samples required for this FSP, a completeness goal of 90% is specified.

Successful analyses are defined as those where the samples arrived at the laboratory intact, properly preserved, in sufficient quantity to perform the requested analyses, and are accompanied by a completed chain of custody. Furthermore, the sample must be analyzed within the specified holding time and in such a manner that analytical QA/QC as described in this document is met.

Completeness for the entire project also involves completeness of field and laboratory documentation, whether all samples and analyses specified in this FSP have been processed and the procedures specified in the FSP have been implemented.

3.3.5 Comparability

Comparability is a qualitative characteristic that refers to the confidence with which one data set can be compared to another. It defines the extent to which a chemical parameter measurement is consistent with, and may be compared to, values from other sampling events. At a minimum, comparable data must be obtained using unbiased sample designs. If sampling designs are not unbiased, the reasons for selecting another design should be well documented. For this portion of the project, the rationale for the sampling design is presented in Section 4.

Comparability among field measurements will be achieved through the use of standard procedures, standard field data sheets, and uniform concentration units. To ensure comparability, field procedures will be standardized, and field operations will adhere to MCPs and TPRs. Laboratory data comparability will be ensured by the use of established and approved analytical methods, consistency in the basis of analysis (e.g., wet weight and volume), and consistency in reporting units. Analysis of standard reference materials will follow EPA or other standard analytical methods that utilize standard units of measurement, methods of analysis, and reporting format.

Data have been collected from areas in the immediate vicinity of the V-Tanks. Therefore, data collected under this sampling plan may be compared to historical data sets to verify radionuclide activity associated with the contents.

3.3.6 Sensitivity

Assuring the validity of quantitative measurements at low concentrations is an extremely difficult technical problem. With regulatory action levels being pushed lower and lower, the validity of any given measurement becomes even more important. The consequences of false positive or false negative data can be significant. The laboratory will report results below the reporting limit as “Not Detected” because, by definition, the reliability of the data at that level is questionable. Organic data that need to be reported below the quantitation limit will have the data flagged accordingly.

Quantitation limits are the extent to which the equipment, laboratory or field, or analytical process can provide accurate, minimum data measurements of a reliable quality for specific constituents in replicate field samples. It is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the value is above zero. The actual quantitation limit for a given analysis will vary depending on instrument sensitivity and matrix effects.

If dilution is required to bring the reported concentration of a single compound of interest within the linear range of the calibration, and the dilution results in nondetect values for all other analytes with detected concentrations in the initial sample analysis, the results of the original run and the dilution will be reported with appropriate notations in the narrative of the report. Matrix effects (i.e., highly contaminated samples requiring dilution for analysis, dilution to bring detected levels within the range of calibration, and matrix interference requiring elevation of detection limits) will be considered in assessing compliance with the requirements for sensitivity.

Several detection levels are utilized in environmental laboratories, such as method detection limits (MDLs), instrument detection levels (IDLs), practical quantitation limits (PQLs), and contract-required quantitation limits (CRQLs). Generally, the detection level is the smallest amount that can be detected above the instrument noise in a procedure and within a stated confidence level.

The MDL is an empirically derived value used to estimate the lowest concentration a method can detect in a matrix-free environment. SW-846 (EPA 1986) defines the MDL as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The MDL is determined from the analysis of replicate samples of a given matrix, containing analytes, which have been processed through the preparation or extraction procedure. The guidance in 40 CFR 136, Appendix B, is used to produce MDLs. Method detection limits are updated by the laboratory annually at a minimum and after significant instrument maintenance.

The PQL is the lowest concentration that can be reliably achieved within limits of precision and accuracy during routine operating conditions. The PQLs for reagent water are generally 3 to 5 times the MDL, but may be less or more based on the performance of the method for a particular analyte. Sample PQLs are highly matrix-dependent. The PQLs provided in SW-846 are for guidance and may not always be achievable.

The CRQL is the PQL after review and approval by regulators (i.e., when the PQL becomes part of a contract) and will be used for this FSP.

3.4 Data Validation

Data validation is the process of data assessment in accordance with EPA regional or national functional guidelines or project-specific guidelines.

Accurate data reduction, validation, and reporting protocols are necessary to interpret data and arrive at decisions. The quality of the data collection process will be assessed through reviews of all measurements performed. The purpose of this section is to discuss the evaluation and assessment of QA/QC requirements necessary to document the quality of the collected data. The frequency of data review validation and verification is discussed below according to the category of data collected.

Data will be acquired, processed, and controlled prior to input to the Integrated Environmental Data Management System (IEDMS) under PRD-5030, “Environmental Requirements for Facilities, Processes, Materials, and Equipment.” For samples submitted to the analytical laboratory for the work acceptance criteria compliance, the definitive data collected will be validated to Level A. Data validation will be performed in accordance with QAPjP (DOE-ID 2004a).

The SAM will validate the data to the levels of analytical method data validation. The analytical method data validation will be conducted in accordance with GDE-205, “Radioanalytical Data Validation.” Validated data are entered into the IEDMS and uploaded to the data warehouse.

4. SAMPLING LOCATION AND FREQUENCY

This section presents the required sample locations and frequency to support the objectives outlined in Section 3. These objectives include collecting samples to: a) characterize the soils remaining in the excavated areas (confirmation sampling) and b) waste consolidation. The data from the soil samples will be used to determine if sufficient soil has been excavated so that the remaining soil meets the cleanup criteria defined in Section 3. Sampling of the GAC and HEPA filters on the V-Tank treatment process will also be conducted for waste disposal characterization.

As stated in Section 1, Cs-137 appears to be an indicator of other contaminants of concern. As such, wide-area gamma scans will be used over identified areas to determine the concentration of Cs-137. Sampling and analysis of the soils underneath the removed V-Tanks, Valve Pit 2, and other known areas of release, will be performed in accordance with the RCRA Closure Plan. These data will then be used to conduct a risk analysis to determine if additional FRGs need to be analyzed under confirmation sampling.

4.1 Sampling Locations

The following sections describe the intended sampling locations, including the rationale for location selection and the analytical methods necessary to meet the data needs discussed in Section 3.1

Table 3-1 gives the sampling and analysis required for each location identified in Figure 1-2.

4.1.1 Underneath Each Tank (Items 1 and 2)

As part of the RCRA Closure Plan (DOE-ID 2004e), a sample will be taken from below each tank (Item 1). The sample will be taken from the centerline of each tank next to its sump. This will result in four biased samples that will undergo full suite analysis as defined in Table 3-1. An additional four unbiased samples will be taken from the V-Tank excavation footprint (Item 2) for the same analyses. The location for these unbiased samples is given in Figure 4-1. This figure shows a 2 ft by 2 ft grid overlaid on the V-tank Excavated Footprint. There are 144 grid squares and the randomly selected areas for soil sampling are designated with circles.

Each of the four unbiased samples will be a composite of 18 sub-samples collected within a radius of 1 ft from the center of the identified grid. The samples will be composited to account for as much sample as possible in order to get as representative a sample as possible. Discrete aliquots of soil from the identified grid will be taken for one sample for VOC analysis.

These samples locations are unbiased selections and were randomly selected from 144 possible locations. If there is some obstacle or interference that does not permit a sample to be collected from a selected grid, then the user can select the nearest location that allows for adequate sample collection. Any changes or problems in the sampling should be duly noted in the sample logbook.

4.1.2 Area of Release (Item 3 If Needed)

Areas that show evidence of release (such as soil discoloration or radiological screening indicates a reading of 100 cpm above surrounding areas) will also be sampled after excavation and subject to full suite analysis. This sampling will be conducted to meet requirements of the RCRA Closure Plan (DOE-ID 2004e).

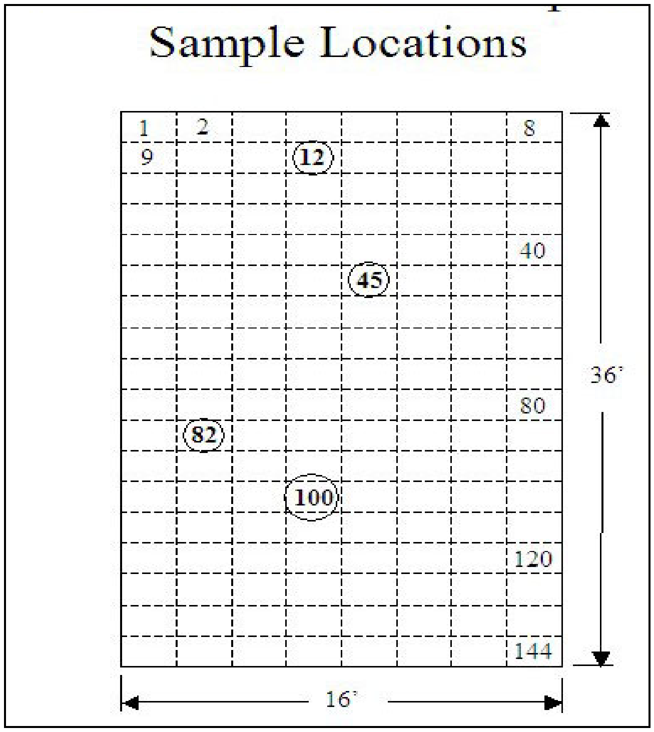

Figure 4-1. V-Tank excavation footprint sampling locations.

4.1.3 Valve Pit 2 (Item 4)

The area below the former location of Valve Pit 2 – TSF 21 will be sampled to meet the requirements of the RCRA Closure Plan (DOE-ID 2004e). Three unbiased samples will be collected and subjected to full suite analysis. The location of these three samples is given in Figure 4-2. This figure shows a 2 ft by 2 ft grid overlaid on the Valve Pit 2 Excavation Footprint. There are nine grid squares, and the randomly selected areas to sample are circled.

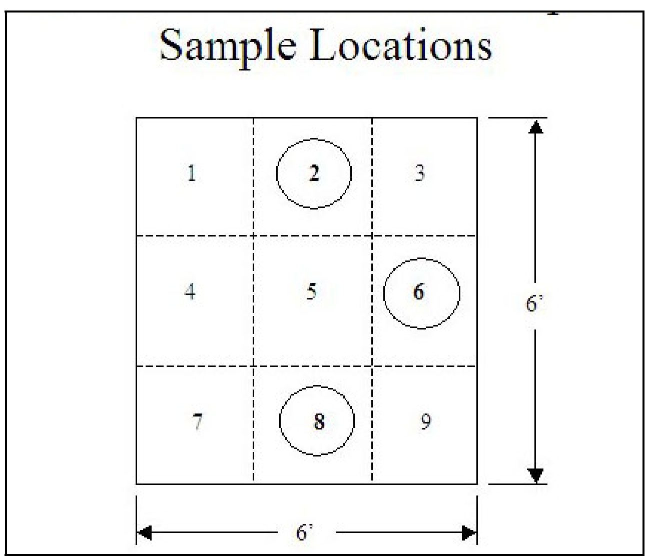

Figure 4-2. Valve Pit 2 excavation footprint sample locations.

4.1.4 Excavated Area (Items 5, 6, 8, and 9)

The Phase 3 excavated area, which corresponds to Items 5, 6, 8, and 9, will be covered by a 35 ft by 35 ft square grid, as shown in Figure 4-3. Each grid will be subject to a wide-area surface gamma scan to determine if the radiological activity of Cs-137 is below 23.3 pCi/g.

Samples of the soil at the end of the cut pipe in the vicinity of Valve Pit 2 (Item 6) will also be taken for full suite analysis (identified in Table 3-2) to meet the requirements of the RCRA Closure Plan (DOE-ID 2004e). These samples will be taken after all soil with radiological activity greater than 23.3 pCi/g of Cs-137 and all visibly stained soils have been removed. Discrete aliquots of soil from the base of the cut pipe area will be taken for one sample for VOC analysis. Eighteen subsamples will be taken from throughout the base of the cut pipe area for homogenization and for full suite analysis.

Soils from below the 633 T (Item 9) will also be subject to full suite analysis using the sampling approach provided for the cut pipe at Valve Pit 2 (Item 6). This sampling event meets the requirements of the RCRA Closure Plan (DOE-ID 2004e).

4.1.5 Tank Laydown Area (Item 7)

If the soil in the tank laydown area has contamination of Cs-137 > 23.3 pCi/g, as determined by a gamma scan and/or visual staining because soil from the exterior of the V-Tanks dislodged to the ground, the soil will be removed from the ground and sampling initiated. Soil at this location could possibly be contaminated not only with Cs-137 > 23.3 pCi/g but with any new FRGs. Four 35- by 35-ft wide-area gamma scans will be conducted over the tank laydown area identified in Figure 1-2 after the tanks have been removed for disposal. Sampling will be conducted as described for the excavated areas.

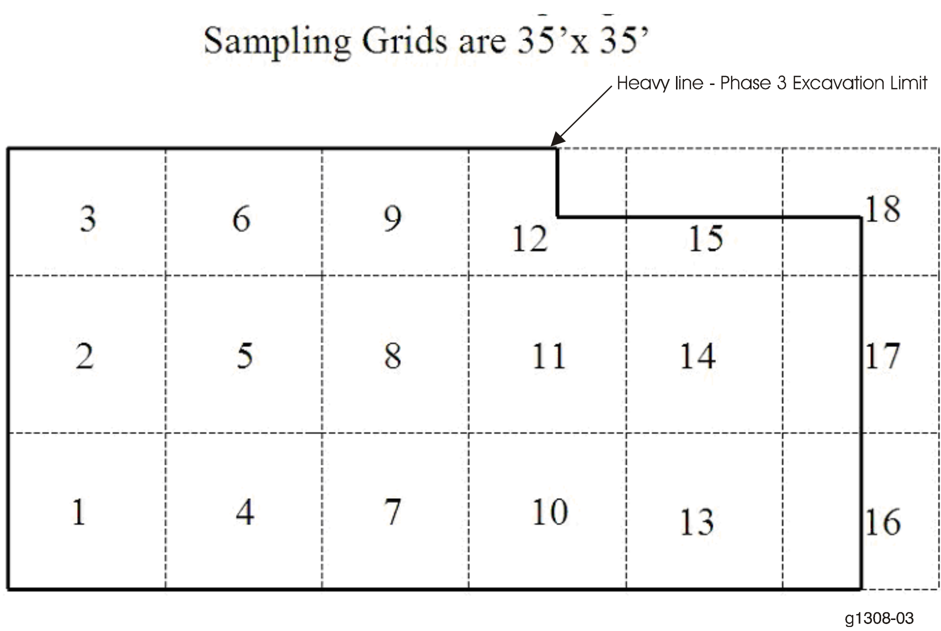

Figure 4-3. Excavated area soil sampling grid.

4.1.6 Below The Staging Stockpile (Item 10)

Excavated soil from the removal of the V-Tanks will be placed on the stockpile area. If any of the tanks leaked, this soil could possibly be contaminated not only with Cs-137 > 23.3 pCi/g but with any new FRGs. This soil and the top 6 in. of surface soil will be removed and disposed at the ICDF. Wide-area surveys (35 by 35 ft) will be conducted over the footprint of the staging stockpile and over the route taken from the excavation area to the stockpile, as shown in Figure 4-4.

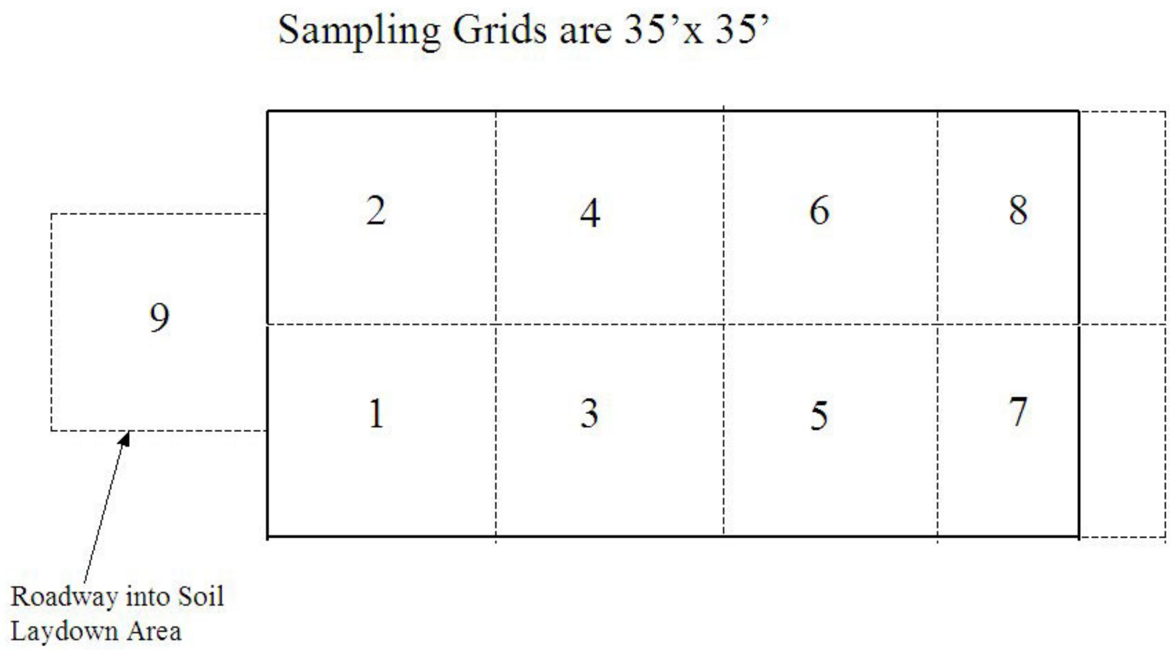

Figure 4-4. Soil stockpile area sampling grid.

4.1.7 Downwind of Staging Stockpile (Item 11)

Windblown soil from the staging stockpile (Item 11) could possibly contaminate soil in the downwind direction. Therefore, a wide-area survey will be conducted in the downwind area after the stockpile has been removed. Grids measuring 35 by 35 ft shall be surveyed beginning at the edge of the stockpile and commencing in a downwind direction. Surveying will continue in a downwind direction (northeast) until surface gamma scans record a value of Cs-137 at < 2.3 pCi/g. Sampling will be conducted as described for the excavated areas.

4.1.8 GAC (Item 12)

One composite sample of the GAC on the off-gas system of the V-Tank treatment system will be taken from throughout the GAC in the canister and analyzed for radiological contamination, TCLP VOCs (SW-846 Method 8260B, EPA 1986), and TCLP SVOCs (SW-846 Method 8270C, EPA 1986). These data will be used to determine disposal requirements.

4.1.9 HEPA (Item 13)

Required samples from the HEPA filter on the off-gas system of the V-Tank treatment system will be taken by cutting the metal frame off the filter and removing the HEPA filter itself in a glove box, or equivalent. Aliquots will be taken from the filter by using scissors to cut the paper at numerous locations throughout the filter and placed in the sample jar. This material will be analyzed for radiological contamination and TCLP metals. Again, this data will be used to determine disposal requirements.

4.1.10 Discretionary Samples (Item 14)

During the sample campaign, the sampling crew may observe the need to collect additional samples to better characterize the general area or localized areas that were previously unnoticed. Therefore, this sampling item is intended to enable the Field Team Leader and the Project Engineer the discretion to collect additional samples while the sampling crew is deployed to the V-Tank site. Collection of these discretionary samples must have the approval of the Project Engineer (PE) and the Health and Safety Officer (HSO). Furthermore, collection of the discretionary samples is not intended to enable significant expansion of the work scope described in this field sampling plan; it is only intended to enable efficient and prompt use of deployed resources.

Collection of discretionary samples must substantially follow the sampling protocols for similar samples described elsewhere in this document; minor deviations are acceptable if jusified and approved by the PE and HSO.

Collection of discretionary samples must be documented in the Sample Log Book in accordance with MCP-9227, "Environmental Services Project Logkeeping Practices."

4.2 Sampling Analytical Requirements

The SAP tables in Appendix A provide the intended sample quantities and analysis for sample type. Tables 5-1 and 5-2 include identification of the suggested container volumes, types, holding times, and preservative requirements that apply to all samples that may be collected under this FSP.

4.3 Quality Assurance/Quality Control Samples

In addition to primary project samples, QA/QC samples will be collected to establish quantitative and qualitative criteria necessary to support the intended regulatory action and to describe the acceptability of the data by providing information comparable to and representative of actual field conditions.

As discussed in Section 3, QC samples consisting of equipment rinsate blanks will be used to determine field accuracy. Equipment rinsate blanks will be collected only for those samples submitted to the laboratory for analysis. Quality control (duplicate) samples are used to measure field precision. Duplicate samples will be collected at an interval of one sample/media. The QA/QC sample results will be evaluated as outlined in the QAPjP (DOE-ID 2004a).

5. SAMPLING AND ANALYSIS PROCEDURES

The following sections describe the planned sampling and analyses described in this FSP for characterization of soils in the excavated areas, below the staging stockpile, downwind of the staging stockpile, and disposal requirements for the GAC and HEPA filter. Prior to commencement of soil sampling activities, a presampling meeting will be held to review the requirements of this FSP and the HASP (ICP 2004c) to ensure supporting documentation has been completed.

All sampling will be conducted in accordance with ICP-MCP-9439, "Environmental Sampling Activities at the INEEL."

5.1 Sampling Requirements

Sampling activities will include field screening for organic and radiological contaminants for personnel health and safety purposes, in accordance with the project-specific HASP (ICP 2004c). Field screening for alpha and beta/gamma radiation will be performed. The HSO and RCT will determine the use of radiological screening instrumentation for health and safety purposes. Calibration of instruments will be performed in accordance with appropriate procedures and the QAPjP (DOE-ID 2004a). Radiological contaminants will be identified when screening indicates a reading of 100 counts per minute (cpm) above surrounding areas.

All sampling procedures will be discussed before sampling in a presampling meeting (i.e. pre-job briefing). The meeting discussion will include, but will not be limited to, sampling activities for the day, responsibilities of team members, and safety issues.

The target analytes for the samples are presented in Tables 5-1 and 5-2. These tables are highly conservative in the list of analytes because the tables presume that all analytes targeted in the RCRA Sampling Plan (INEEL 2003a) become FRG contaminants through the risk analysis process. However, on the basis of currently available information, Cs-137 is likely to remain the sole FRG contaminant and hence the only contaminant targeted. Tables 5-1 and 5-2 are written conservatively so that the laboratory contract can be properly placed.

Sample volumes and sample container guidance are provided in Tables 5-1 and 5-2. Table 5-1 includes sampling details for obtaining sample volumes for radiological analyses, and Table 5-2 includes sampling details for obtaining sample volumes for chemical analyses. The anticipated equipment requirements are listed in Section 7.2, "Sample Equipment and Handling."

For all collected samples, all analyses will undergo Level A Analytical Method Data Validation (AMDV).

Section 4 describes the soil sampling, GAC sampling, and HEPA filter sampling that will be performed by the sampling team to obtain the data needs delineated in this FSP. Field deviations from the SAP table presented in Appendix A will be in accordance with MCP-233, "Process for Developing, Releasing, and Distributing ER Documents (Supplemental to MCP-135 and MCP-9395)."

Table 5-1. Summary of sample collection, holding time, and preservation requirements for radiological analyses.

Radionuclide	Method[a]	Analysis (Alpha/Gamma/Specific)	Recommended Detection Limit (pCi/g)[b]	Sample Media	Container Size[c]	Container Type	Holding Time[d] (Months)	Sample Preservation
Cs-137	ER-SOW-394	Gamma	0.1	Soil	16 oz.	Wide Mouth Plastic Jar	6	None
If the RCRA Sampling activity and subsequent risk analysis identifies other contaminants to be included as FRGs, then some, but not necessarily all, of the following radionuclides may be added.								
Pu-238	ER-SOW-394	Alpha	0.05	Soil	16 oz.	Wide Mouth Plastic Jar	6	None
Pu-239/240	ER-SOW-394	Alpha	0.05	Soil		Wide Mouth Plastic Jar	6	None
Am-241	ER-SOW-394	Alpha	0.05	Soil		Wide Mouth Plastic Jar	6	None
Cm-242	ER-SOW-394	Alpha	0.05	Soil		Wide Mouth Plastic Jar	6	None
Cm-243/244	ER-SOW-394	Alpha	0.05	Soil		Wide Mouth Plastic Jar	6	None
Np-237	ER-SOW-394	Alpha	0.05	Soil		Wide Mouth Plastic Jar	6	None
U-233/234	ER-SOW-394	Alpha	0.05	Soil		Wide Mouth Plastic Jar	6	None
U-235	ER-SOW-394	Alpha	0.05	Soil		Wide Mouth Plastic Jar	6	None
U-238	ER-SOW-394	Alpha	0.05	Soil		Wide Mouth Plastic Jar	6	None
Co-60	ER-SOW-394	Gamma	TBD[e]	Soil		Wide Mouth Plastic Jar	6	None
Cs-134	ER-SOW-394	Gamma	TBD[e]	Soil		Wide Mouth Plastic Jar	6	None
Eu-152	ER-SOW-394	Gamma	TBD[e]	Soil		Wide Mouth Plastic Jar	6	None
Eu-154	ER-SOW-394	Gamma	TBD[e]	Soil		Wide Mouth Plastic Jar	6	None
Eu-155	ER-SOW-394	Gamma	TBD[e]	Soil		Wide Mouth Plastic Jar	6	None
Sb-125	ER-SOW-394	Gamma	TBD[e]	Soil		Wide Mouth Plastic Jar	6	None
Sr-90	ER-SOW-394	Specific	TBD[e]	Soil		Wide Mouth Plastic Jar	6	None
I-129	ER-SOW-394	Specific	1.0	Soil		Wide Mouth Plastic Jar [f]	6	4ºC
Ni-63	ER-SOW-394	Specific	5.0	Soil		Wide Mouth Plastic Jar	6	None
H-3	ER-SOW-394	Specific	20.0	Soil		Wide Mouth Plastic Jar [g]	6	4ºC
Ag-108m	ER-SOW-394	Gamma	TBD[e]	Soil		Wide Mouth Plastic Jar	6	None
Ag-110m	ER-SOW-394	Gamma	TBD[e]	Soil		Wide Mouth Plastic Jar	6	None
Ce-144	ER-SOW-394	Gamma	TBD[e]	Soil		Wide Mouth Plastic Jar	6	None
Co-58	ER-SOW-394	Gamma	TBD[e]	Soil		Wide Mouth Plastic Jar	6	None
Mn-54	ER-SOW-394	Gamma	TBD[e]	Soil		Wide Mouth Plastic Jar	6	None
Nb-95	ER-SOW-394	Gamma	TBD[e]	Soil		Wide Mouth Plastic Jar	6	None

Table 5-1. (continued).

Radionuclide	Method[a]	Analysis (Alpha/Gamma/Specific)	Recommended Detection Limit (pCi/g)[b]	Sample Media	Container Size[c]	Container Type	Holding Time[d] (Months)	Sample Preservation
Ra-226	ER-SOW-394	Specific	0.5	Soil		Wide Mouth Plastic Jar	6	None
Ru-103	ER-SOW-394	Gamma	TBD[e]	Soil		Wide Mouth Plastic Jar	6	None
Ru-106	ER-SOW-394	Gamma	TBD[e]	Soil		Wide Mouth Plastic Jar	6	None
Zn-65	ER-SOW-394	Gamma	TBD[e]	Soil		Wide Mouth Plastic Jar	6	None
Zr-95	ER-SOW-394	Gamma	TBD[e]	Soil		Wide Mouth Plastic Jar	6	None

a. ER-SOW-394, 2004, "Idaho National Engineering and Environmental Laboratory Sample and Analysis Management Statement of Work for Analytical Services," Rev. 2, May 2004

b. Recommended detection limits are provided for information purposes only. These limits are for use by the analytical laboratory and do not impact field sampling activities.

c. Volumes vary depending on the requested analysis and the laboratory performing the analysis. Exact volumes required will be specified to project personnel following final determination of the analytical services provider. In general, one 16-oz sample can be used to complete the required analyses; however, it may be desirable to provide three 16 oz. samples to expedite analysis, one for gamma analysis, one for alpha analysis, and one for specific radiochemical analysis.

d. The holding time requirement of six months is described in 40 CFR 136 (EPA guidelines for analysis of pollutants) and is applied in this FSP as a general guideline. For analysis of volatile radionuclides not listed above or radionuclides with short half-lives (e.g., 131I), the holding times will be adjusted accordingly and disseminated to the laboratory via a project-specific statement of work.

e. All gamma emitting isotopes shall have a detection limit commensurate with their photon yield and energy as related to the Cs-137 detection limit.

f. Collecting samples for I-129 in HDPE containers is permissible/acceptable; however, the holding time requirement is 28 days (instead of six months).

g. Samples containing high levels of tritium (^{3}H), which is defined by this FSP as concentrations that exceed 10^{4} pCi/L, must be collected in glass containers.

CFR = Code of Federal Regulations
EPA = U.S. Environmental Protection Agency
ER-SOW = Environmental Restoration Statement of Work
FSP = field sampling plan
HDPE = high-density polyethylene
TBD = to be determined

Table 5-2. Summary of sample collection, holding time, and preservation requirements for samples collected for inorganic and organic analyses.
Note: These contaminants will only be targeted if the RCRA Sampling and subsequent risk assessment identifies the need to expand the list of FRG contaminants. Based upon current information, elimination of all of these contaminants is anticipated.

Hazardous Waste Management Act-Required Sampling and Analysis

Contaminant [a]	CAS	SW-846 Preparation Method [b]	SW-846 Analysis Method [b]	Recommended Detection Limit (mg/Kg)[c,d,e]	Sample Media	Container Size	Container Type	Holding Time (Months)	Sample Preservation
Metals									
Ag	7440-22-4	SW846-3050B or 3051	SW846-6010B	10.0	Soil		WM Glass Bottle	6	4ºC
Al	7429-90-5	SW846-3050B or 3051	SW846-6010B	60.0	Soil		WM Glass Bottle	6	4ºC
As	7440-38-2	SW846-3050B or 3051	SW846-6010B	70.0	Soil		WM Glass Bottle	6	4ºC
Ba	7440-39-3	SW846-3050B or 3051	SW846-6010B	2.0	Soil		WM Glass Bottle	6	4ºC
Be	7440-41-7	SW846-3050B or 3051	SW846-6010B	0.4	Soil		WM Glass Bottle	6	4ºC
Cd	7440-43-9	SW846-3050B or 3051	SW846-6010B	5.0	Soil		WM Glass Bottle	6	4ºC
Cr	7440-47-3	SW846-3050B or 3051	SW846-6010B	10.0	Soil		WM Glass Bottle	6	4ºC
Fe	7439-89-6	SW846-3050B or 3051	SW846-6010B	9.0	Soil		WM Glass Bottle	6	4ºC
Mn	7439-96-5	SW846-3050B or 3051	SW846-6010B	2.0	Soil	60 mL	WM Glass Bottle	6	4ºC
Ni	7440-02-0	SW846-3050B or 3051	SW846-6010B	20.0	Soil		WM Glass Bottle	6	4ºC
P	7723-14-0	SW846-3050B or 3051	SW846-6010B	100.0	Soil		WM Glass Bottle	6	4ºC
Pb	7439-92-1	SW846-3050B or 3051	SW846-7420	0.6	Soil		WM Glass Bottle	6	4ºC
Sb	7440-36-0	SW846-3050B or 3051	SW846-6010B	40.0	Soil		WM Glass Bottle	6	4ºC
Se	7782-49-2	SW846-3050B or 3051	SW846-6010B	100.0	Soil		WM Glass Bottle	6	4ºC
Tl	7440-28-0	SW846-3050B or 3051	SW846-6010B	55.0	Soil		WM Glass Bottle	6	4ºC
V	7440-62-2	SW846-3050B or 3051	SW846-6010B	10.0	Soil		WM Glass Bottle	6	4ºC
Zn	7440-66-6	SW846-3050B or 3051	SW846-6010B	3.0	Soil		WM Glass Bottle	6	4ºC
Hg	7439-97-6	SW846-7471A		0.08	Soil	30 mL	WM Glass Bottle	28 Days	4ºC
Anions									
CN	57-12-5	SW846-9010B		2.0	Soil	125 mL	WM Glass Bottle	14 Days	4ºC
F	16984-48-8	SW846-9056		1.0	Soil	60 mL	WM Glass Bottle	28 Days	4ºC
Polychlorinated Byphenyls									
Aroclor-1260	11096-82-5	SW846-3540 or 3541	SW846-8082	0.033	Soil	250 mL	WM Amber Glass Bottle	14 Days/40 Days [f]	4ºC
Volatile Organic Analytes									
1,1-dichloroethane	75-34-3	SW846-5035	SW846-8260B	0.01	Soil	125 mL	WM Amber Glass Bottle	14 Days	4ºC
1,2-dichloroethylene	540-59-0	SW846-5035	SW846-8260B	0.01	Soil		WM Amber Glass Bottle	14 Days	4ºC
bromomethane	74-83-9	SW846-5035	SW846-8260B	0.01	Soil		WM Amber Glass Bottle	14 Days	4ºC
chloromethane	74-87-3	SW846-5035	SW846-8260B	0.01	Soil		WM Amber Glass Bottle	14 Days	4ºC

Table 5-2. (continued).

Hazardous Waste Management Act-Required Sampling and Analysis									
Contaminant [a]	CAS	SW-846 Preparation Method [b]	SW-846 Analysis Method [b]	Recommended Detection Limit (mg/Kg)[c,d,e]	Sample Media	Container Size	Container Type	Holding Time (Months)	Sample Preservation
methylene chloride	75-09-2	SW846-5035	SW846-8260B	0.01	Soil		WM Amber Glass Bottle	14 Days	4ºC
tetrachloroethene	127-18-4	SW846-5035	SW846-8260B	0.01	Soil		WM Amber Glass Bottle	14 Days	4ºC
trichloroethene	79-01-6	SW846-5035	SW846-8260B	0.01	Soil		WM Amber Glass Bottle	14 Days	4ºC
trichlrorethane	25323-89-1	SW846-5035	SW846-8260B	0.01	Soil		WM Amber Glass Bottle	14 Days	4ºC
vinyl chloride	75-01-4	SW846-5035	SW846-8260B	0.01	Soil		WM Amber Glass Bottle	14 Days	4ºC
Semivolatile Organic Analytes									
1,2.4-trichlorobenzene	120-82-1	SW846-3540 or 3541	SW846-8270C	0.33	Soil		WM Amber Glass Bottle	14 Days/40 Days [f]	4ºC
1,2-dichlorobenzene	95-50-1	SW846-3540 or 3541	SW846-8270C	0.33	Soil		WM Amber Glass Bottle	14 Days/40 Days [f]	4ºC
1,3-dichlorobenzene	541-73-1	SW846-3540 or 3541	SW846-8270C	0.33	Soil		WM Amber Glass Bottle	14 Days/40 Days [f]	4ºC
1,4-dichlorobenzene	106-46-7	SW846-3540 or 3541	SW846-8270C	0.33	Soil		WM Amber Glass Bottle	14 Days/40 Days [f]	4ºC
2,4-dimethylphenol	105-67-9	SW846-3540 or 3541	SW846-8270C	0.33	Soil		WM Amber Glass Bottle	14 Days/40 Days [f]	4ºC
2-methylphenol	95-48-7	SW846-3540 or 3541	SW846-8270C	0.33	Soil		WM Amber Glass Bottle	14 Days/40 Days [f]	4ºC
4,6-dinitro-2-methylphenol	534-52-1	SW846-3540 or 3541	SW846-8270C	0.83	Soil		WM Amber Glass Bottle	14 Days/40 Days [f]	4ºC
4-methylphenol	106-44-5	SW846-3540 or 3541	SW846-8270C	0.33	Soil		WM Amber Glass Bottle	14 Days/40 Days [f]	4ºC
4-nitrophenol	100-02-7	SW846-3540 or 3541	SW846-8270C	0.83	Soil		WM Amber Glass Bottle	14 Days/40 Days [f]	4ºC
bis(2-ethylhexyl) phthalate	117-81-7	SW846-3540 or 3541	SW846-8270C	0.33	Soil	250 mL	WM Amber Glass Bottle	14 Days/40 Days [f]	4ºC
di-n-butylphthalate	84-74-2	SW846-3540 or 3541	SW846-8270C	0.33	Soil		WM Amber Glass Bottle	14 Days/40 Days [f]	4ºC
di-n-octylphthalate	117-84-0	SW846-3540 or 3541	SW846-8270C	0.33	Soil		WM Amber Glass Bottle	14 Days/40 Days [f]	4ºC
naphthalene	91-20-3	SW846-3540 or 3541	SW846-8270C	0.33	Soil		WM Amber Glass Bottle	14 Days/40 Days [f]	4ºC
phenol	108-95-2	SW846-3540 or 3541	SW846-8270C	0.33	Soil		WM Amber Glass Bottle	14 Days/40 Days [f]	4ºC
pyrene	129-00-0	SW846-3540 or 3541	SW846-8270C	0.33	Soil		WM Amber Glass Bottle	14 Days/40 Days [f]	4ºC

a. The "contaminant of concern" list was developed based on detections of constituents in the existing waste matrix contained within collecting tanks V-1, -2, and -3 and sump tank V-9. To account for analytical uncertainties associated with historical characterization data, the samples are currently planned to be analyzed for all contract laboratory program (CLP) target analyte lists, which bound the contaminant of concern list.

b. SW-846 Methods are from EPA 1986.

c. Metals method detection limits (MDLs) are based on published instrument detection limits (IDLs) and the following assumptions: The MDL is 10× the IDL, 1.0 gram soil is digested and that there is no soil moisture present, Method 3050B is used for sample preparation (except for mercury). If Method 3051 is used for sample preparation, the MDLs are 0.5x the value listed.

d. For organic analytes, the values listed are the published practical quantitation limits (PQLs). The PQL is typically 5-10 times greater than the MDL.

e. Recommended detection limits are provided for information purposes only. These limits are for use by the analytical laboratory and do not impact field sampling activities.

f. Days to extract and days from completion of extraction to complete analysis.

5.1.1 Rinsates and Blanks

Equipment rinsate samples will be collected from the soil sampling equipment by pouring analyte-free water over the decontaminated sampling equipment and then into the appropriate sample containers. Quality control samples include trip and field blanks introduced at the appropriate point of the sampling event. Trip blanks evaluate cross-contamination during sample handling, shipment, and storage. Both trip and field blanks check cross-contamination during sample collection and shipment. Field blanks also provide information on contamination introduced by ambient site conditions. Per the guidance of the *Quality Assurance Project Plan for Waste Area Groups 1,2,3,4,5,6,7,10, and Inactive Sites* (DOE-ID 2004a), trip blanks and field blanks are not appropriate for collection of soil samples. Field blanks are not required for the soil samples because the very low level of cross contamination that is detectable using field blanks would not affect a detection concerning the data obtained from measurements on the soil. As only soil samples are to be collected for this confirmation effort, no field or trip blanks will be collected.

5.1.2 Field Decontamination

Field decontamination procedures will be designed to prevent cross-contamination between locations and samples and to prevent offsite contaminant migration. Equipment associated with the field surveys and soil sampling will be thoroughly decontaminated prior to initial use and between sample locations. Rinsate QA samples will be collected 1 per 20 sampling assemblies. Following decontamination, sampling equipment will be wrapped in foil to prevent contamination from windblown dust. Wet wipes, brushes, and steam cleaners may be used for decontamination. The use of free liquids will be minimized.

Treatment skid sampling equipment will only be used once. The used equipment will be treated as a debris waste stream and will be managed as debris contaminated with V-Tank contents.

5.1.3 Personal Protective Equipment

The PPE required for these sampling efforts is discussed in the project HASP (ICP 2004c) and may include, but will not be limited to:

- Gloves
- Respirator cartridges
- Shoe covers
- Anti-contamination coveralls/clothes.

Fall protection equipment may be required when sampling from the unprotected edges of excavations. Contact Industrial Safety to perform fall protection hazard analysis prior to sampling. In the event that employees are required to enter into excavations greater the 4 ft in depth, they will need to be protected from cave-in's by the protection afforded by sloping or shoring. Contact the Safety Engineer prior to entry into excavations for analysis and direction. Prior to disposal, PPE will be characterized based on soil samples, treatment tank contents, and health and safety field screening results. A hazardous waste determination will be made pursuant to the requirements set forth by WGS MCPs (MCP-62, MCP-63, MCP-69, and MCP-70), the *Idaho National Engineering and Environmental Laboratory Waste Acceptance Criteria* (DOE-ID 2004d), and the *Waste Certification Plan for the Environmental Restoration Program* (INEL 1997).

5.1.4 Shipping Screening

All samples collected from radiologically contaminated areas will be field-screened for external contamination by the RCT prior to being released from the project work site. The RCT will determine if samples meet the release criteria, as documented in the radiation work permit (RWP) (INEEL Form 441.49). In accordance with DOT regulations and current company policies, a company-certified hazardous materials shipper will transfer all hazardous materials. If the samples cannot be radiologically free released or are determined to be a radioactive material under DOT, then an existing Integrated Waste Tracking System (IWTS) material profile for V-Tank soil may be used to determine the radiological source term for shipping purposes, or a sample can be sent to the radiological measurement laboratory for alpha, beta, and gamma analysis.

5.2 Handling and Disposition of Investigation-Derived Waste

All waste streams that are generated as a result of the sampling activities will be managed in accordance with the *Waste Management Plan for the TSF-09/18 V-Tank and Contents Removal and Site Remediation Test Area North, Waste Area Group 1, Operable Unit 1-10* (ICP 2004b). If a waste stream of decontamination water (which may include deionized water and soap) is generated, it will be collected, sampled, analyzed (see Appendix A, SAP Tables), and characterized for proper waste management. The volume of decontamination fluids produced will be minimized by using spray bottles or wipes to apply the fluids.

6. SAMPLING DESIGNATION

Samples will be identified with a unique code and arranged in a SAP table and database.

6.1 Sample Identification Code

The following example sample designation will be used in the sample logbook and on sample labels:

- First three characters: project code (e.g., TAN)
- Fourth, fifth, and sixth characters: sequential number used for designating different locations (e.g., 001)
- Seventh and eighth characters: number of samples to be collected (e.g., 001)
- Ninth and tenth characters: bottle code used for analysis identification (e.g., T1 for toxicity characteristic leaching procedure [TCLP] metals analysis).

The sample designation TAN00101T1, then, would indicate that the sample is from TAN, that it is the first sample in a sequence (001), that only one sample is to be collected in the sequence (01), and that it is to be analyzed for TCLP metals (TI). The SAP table correlates the sample number to the specific building and location sampled. Appendix A contains the SAP table for this sampling event.

6.2 Sampling and Analysis Plan Table/Database

6.2.1 General

An SAP table format was developed to simplify the presentation of the sampling scheme for project personnel. The following sections describe the information recorded in the SAP table presented in Appendix A.

6.2.2 Sample Description Fields

The sample description fields contain information relating to individual sample characteristics.

6.2.2.1 Sample Identifier. The sampling activity field contains the first six characters of the assigned sample number. The entire sample number will be used to link information from other sources (field data, analytical data) to the information in the SAP tables for data reporting, sample tracking, and completeness reporting. The analytical laboratory will also use the sample number to track and report analytical results. The letter R in the Sampling Activity field identifies this sample as a RCRA closure sample.

6.2.2.2 Sample Type. Data in this field will be selected from the following:

- **REG** for a regular sample
- **QC** for a quality control sample.

6.2.2.3 Media. Data in this field will be **SOIL** for soil samples, **FILTER** for HEPA samples, **ACT. CARBON** for GAC samples, and **WATER** for applicable QA/QC samples.

6.2.2.4 Collection Type. Data in this field will be selected from the following:

- **COMP** for composite
- **RNST** for rinsates
- **DUP** for duplicate samples.

6.2.2.5 Planned Date. The planned sample collection start date is December 2004.

6.2.3 Sample Location Fields

The sample location fields group pinpoints the exact location for the sample in three-dimensional space, starting with the general AREA, narrowing the focus to an exact location geographically, and then specifying the DEPTH in the depth field.

6.2.3.1 Area. The AREA field identifies the general WAG (in this case, TAN) sample-collection area. The AREA field will contain the standard identifier from the INEEL area being sampled. For this project, the AREA field will say TAN, for Test Area North.

6.2.3.2 Location. The LOCATION field will contain the grid identifier, if applicable. Data in this field will normally be subordinate to the AREA. This information is included on the labels generated by the SAM to aid sampling personnel.

6.2.3.3 Type of Location. The TYPE OF LOCATION field will provide descriptive information concerning the exact sample location.

6.2.3.4 Depth. The DEPTH of a sample location will correspond to the depth of the collected soil sample.

6.2.3.5 Matrix/Media. The matrix for a sample will be entered as “soil,” “water,” “filter,” or “activated carbon” based on the sample.

6.2.4 Analysis Type

The ANALYSIS TYPE fields indicate analytical types (i.e., radiological or chemical). Space is provided at the bottom of the form to clearly identify each type. A standard abbreviation should also be provided, if possible.

7. DOCUMENTATION MANAGEMENT AND SAMPLE CONTROL

Section 7.1 summarizes document management and sample control. Documentation includes field logbooks used to record field data and sampling procedures, photographic documentation, chain-of-custody forms, and sample container labels. Section 7.2 outlines sample handling and discusses chain-of-custody, radiological screening, and sample packaging for shipment to the analytical laboratories.

7.1 Documentation

The FTL will be responsible for controlling and maintaining all field documents and records, and for ensuring that all required documents are submitted to the ER Administrative Record and Document Control offices at the conclusion of the project. Recordkeeping will be conducted in accordance with MCP-557, "Managing Records."

Sample documentation, shipping, and custody procedures for this project are based on EPA-recommended procedures that emphasize careful documentation of sample collection and sample transfer. The appropriate information pertaining to each sample will be recorded in accordance with MCP-9227 and the QAPjP (DOE-ID 2004a). All personnel involved with handling, managing, or disposing of samples will be trained in accordance to PRD-5030, "Environmental Requirements for Facilities, Processes, Materials, and Equipment."

A document action request (DAR) is required when field conditions dictate making any change (i.e., requiring additional analyses to meet appropriate waste acceptance criteria) to this FSP, the project HASP (ICP 2004c), or project procedures. If necessary, a DAR will be executed in accordance with MCP-233, "Process for Developing, Releasing, and Distributing ER Documents."

All information recorded on project documentation will be made in permanent ink. All errors will be corrected by drawing a single line through the error and entering the correct information, and all corrections will be initialed and dated. In addition, photographs will be taken to document field-sampling activities.

7.1.1 Sample Container Labels

Waterproof, gummed labels generated from the IEDMS database will display information such as the sample identification number, the name of the project, sample location, depth, and requested analysis type. Labeling by ER is per MCP-9228, "Environmental Sample Management." In the field, label information will be completed and placed on the containers before the samples are collected. Information concerning sample date, time, the preservative used, field measurements of hazards, and the sampler's initials will be recorded during field sampling.

7.1.2 Field Guidance Forms

Field guidance forms, provided for each sample location (field and treatment skid samples), will be generated from the IEDMS database (see MCP-9227). These forms are used to facilitate sample container documentation and organization of field activities and contain information regarding the following:

- Media
- Aliquot identification

- Analysis type
- Container size and type
- Sample preservation methods.

7.1.2.1 Sample Logbooks. The field teams will use the sample logbooks. Each sample logbook will contain information such as:

- Physical measurements (if applicable)
- All QA/QC samples
- Shipping information (e.g., collection dates, shipping dates, cooler identification number, destination, chain-of-custody number, and name of shipper).
- All the team activities
- Problems encountered
- Visitors
- A list of work site contacts
- Deviation from procedures or protocols
- Discretionary sample collection (See Table 3-2, Item 14).

Sample logbooks will be used to record information necessary to interpret the analytical data. All logbooks will be controlled and managed according to MCP-9227. The FTL, or designee, will ensure by periodic inspection that the logbooks are being maintained in accordance with this MCP. The logbooks will be submitted to the project files at the completion of field activities.

This logbook will be signed and dated at the end of each day's sampling activities.

7.1.2.2 Field Instrument Calibration/Standardization Logbook. A logbook containing records of calibration data will be maintained for each piece of equipment which requires periodic calibration or standardization. This logbook will contain logsheets to record the date, time, method of calibration, and instrument identification number.

7.2 Sample Equipment and Handling

Analytical samples for laboratory analyses will be collected in precleaned bottles and packaged in accordance with MCP-9228. The QA/QC samples will be included to satisfy the QA/QC requirements for the field operation as outlined in the QAPjP (DOE-ID 2004a). Qualified (SAM-approved) analytical and testing laboratories will analyze these samples. All samples will be radiologically screened by RadCon prior to shipment.

7.2.1 Sample Equipment

Included below is a tentative list of equipment and supplies. This list is as extensive as possible, but not exhaustive, and should only be used as a guide. Other equipment and supplies specified in the project-specific HASP (ICP 2004c) and revised TPRs are not included in this section. Field sampling and decontamination equipment may include:

- Tape measure (30.5 m [100 ft])
- Stainless steel or aluminum pans
- Stainless steel sampling spoons
- Sheet metal cutters
- Scissors
- 16-oz plastic bottles
- High Purity Germanium detector
- Gamma analyzer
- Coolers
- Blue Ice
- Paper wipes
- Plastic garbage bags
- Deionized water (20 L [5.3 gal] minimum)
- Nonphosphate-based soap
- Spray bottles
- Aluminum foil
- Sample logbook (see MCP-9227)
- Controlled copies of this FSP, QAPjP (DOE-ID 2004a), HASP (ICP 2004c), and applicable referenced procedures
- Black-ink pens
- Black ultra-fine markers
- Sample containers, as specified in the SAM Field Guidance Forms found in MCPs 9227-9228
- Preprinted sample labels and field guidance forms
- Nitrile or latex gloves
- Leather work gloves
- Resealable plastic bags (such as Ziploc®)[e]
- Custody seals.

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e. References herein to any commercial product, process, or service by trade name , trademark, manufacture, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the U.S. Government, any agency thereof, or any company affiliated with the Idaho National Engineering and Environmental Laboratory or the Idaho Completion Project.

Sample preparation and shipping supplies may include:

- pH paper
- Nitrile or latex gloves
- Paper wipes
- Parafilm
- Clear tape
- Permanent ink markers
- Strapping tape
- Chain-of-custody forms
- Shipping request forms
- Names, addresses, telephone numbers, and contact names for analytical laboratories
- Task order SOWs for analytical laboratories and associated purchase order numbers
- Vermiculite or bubble-wrap (packaging material)
- Plastic garbage bags
- Blue Ice
- Coolers, or other packaging
- "This side up" and "Fragile" labels
- Address labels
- Sample bottles and lids
- Custody seals.

7.2.2 Sample Containers

Tables 5-1 and 5-2 suggest the container volumes, types, holding times, and preservative requirements that apply to all solid and liquid samples being collected under this FSP. All containers will be precleaned (certified by the manufacturer) with the appropriate EPA-recommended cleaning protocols for the bottle type and sample analyses. Sample containers for radiological analysis are not required to be precleaned or certified. Extra containers will be available in case of breakage, contamination, or collection of additional samples. Prior to use, preprinted labels with the name of the project, sample identification number, location, and requested analysis will be affixed to the sample containers.

7.2.3 Sample Preservation

All samples will be preserved in a manner consistent with the QAPjP (DOE-ID 2004a). If cooling is required for preservation, ice chests (coolers) containing frozen reusable ice will be used to chill samples in the field after collection.

7.2.4 Chain-of-Custody Procedures

The chain-of-custody procedures will be followed per PRD-5030, MCP-9228, and the QAPjP (DOE-ID 2004a). Sample bottles will be stored in a secured area accessible only to the field team members.

7.2.5 Transportation of Samples

Samples will be shipped in accordance with the regulations issued by the DOT (49 CFR Parts 171 through 178) and EPA sample handling, packaging, and shipping methods (40 CFR 262). All samples will be packaged in accordance with the requirements set forth in MCP-9228.

7.2.5.1 Custody Seals. Custody seals will be placed on all shipping containers to ensure that tampering or unauthorized opening will not compromise sample integrity (see MCP-9228). The seal will be attached in such a way that opening the container requires that the seal be broken. Clear plastic tape will be placed over the seals to ensure that the seals are not damaged during shipment. Seals will be affixed to containers before the samples leave the custody of the sampling personnel.

7.2.5.2 Onsite and Offsite Shipping. An on-Site shipment is any transfer of material within the perimeter of the INEEL. Worksite-specific requirements for transporting samples within worksite boundaries, in addition to those required by the shipping/receiving department, will be followed. Shipment within the INEEL boundaries will conform to DOT requirements, as stated in 49 CFR. Any off-Site sample shipment will be coordinated with INEEL Packaging and Transportation personnel, as necessary, and will conform to all applicable DOT requirements.

7.3 Documentation Revision Requests

Revisions to this document will follow MCP-233, "Process for Developing, Releasing, and Distributing ER Documents."

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Appendix A

SAP Tables

Plan Table Number: V-TANK_SOILFY04

DRAFT

SAP Number: ICP/EXT-04-00289

Date: 08/17/2004 Plan Table Revision: 0 Project: TAN V-TANK SURROUNDING SOIL Project Manager: JESSMORE, J. J. SMO Contact: ELDER, T. E.

Sample Description						Sample Location				Enter Analysis Types (AT) and Quantity Requested																			
Sampling Activity	Sample Type	Sample Matrix	Coll Type	Sampling Method	Planned Date	Area	Type of Location	Location	Depth (ft)	AT1 C2	AT2 F1	AT3 PC	AT4 PB	AT5 RH	AT6 RN	AT7 EL	AT8 EM	AT9 TI	AT10 TA	AT11 TV	AT12 LM	AT13 VL	AT14 VM	AT15	AT16	AT17	AT18	AT19	AT20
VTK020	REG	ACT. CARBON	COMP		12/2004	TAN-666	TREATMENT TANK	EXHAUST SYSTEM	N/A					1					1	1									
VTK021	REG	FILTER	COMP		12/2004	TAN-666	TREATMENT TANK	EXHAUST SYSTEM	N/A					1				1											
VTK022	REG	SOIL	COMP		12/2004	TAN	633 T	#1	SURFACE			1		1	1	1					1	1							
VTK023	REG	SOIL	COMP		12/2004	TAN	DISCRETIONARY	#1	SURFACE	1	1	1		1	1	1					1	1							
VTK024	REG	SOIL	COMP		12/2004	TAN	DISCRETIONARY	#2	SURFACE	1	1	1		1	1	1					1	1							
VTK025	REG	SOIL	COMP		12/2004	TAN	DISCRETIONARY	#3	SURFACE	1	1	1		1	1	1					1	1							
VTR001	REG	SOIL	COMP		12/2004	TAN V-TANK	EXCAVATION SOIL	#1	SURFACE	1	1	1		1	1	1					1	1							
VTR002	REG/QC	SOIL	DUP		12/2004	TAN V-TANK	EXCAVATION SOIL	#2	SURFACE	2	2	2		2	2	2					2	2							
VTR003	REG	SOIL	COMP		12/2004	TAN V-TANK	EXCAVATION SOIL	#3	SURFACE	1	1	1		1	1	1					1	1							
VTR004	REG	SOIL	COMP		12/2004	TAN V-TANK	EXCAVATION SOIL	#4	SURFACE	1	1	1		1	1	1					1	1							
VTR005	REG	SOIL	COMP		12/2004	TAN V-TANK	EXCAVATION SOIL	#5	SURFACE	1	1	1		1	1	1					1	1							
VTR006	REG	SOIL	COMP		12/2004	TAN V-TANK	EXCAVATION SOIL	#6	SURFACE	1	1	1		1	1	1					1	1							
VTR007	REG	SOIL	COMP		12/2004	TAN V-TANK	EXCAVATION SOIL	#7	SURFACE	1	1	1		1	1	1					1	1							
VTR008	REG	SOIL	COMP		12/2004	TAN V-TANK	EXCAVATION SOIL	#8	SURFACE	1	1	1		1	1	1					1	1							
VTR009	QC	WATER	RNST		12/2004	TAN V-TANK	EQUIP. RINSATE	PRE SAMPLE QC	N/A			1		1	1	1					1	1							

The sampling activity displayed on this table represents the first 6 to 9 characters of the sample identification number. The complete sample identification number will appear on the sample labels.

AT1: Cyanide
AT2: Fluoride
AT3: PCBs
AT4: PCBs - MS/MSD
AT5: Radiochemistry - Suite 1
AT6: Radiochemistry - Suite 2
AT7: SVOCs (CLP TAL)
AT8: SVOCs (CLP TAL) - MS/MSD
AT9: TCLP Metals
AT10: TCLP SVOCs
AT11: TCLP VOCs
AT12: Total Metals (CLP TAL)
AT13: VOCs (CLP TAL)
AT14: VOCs (CLP TAL) - MS/MSD
AT15:
AT16:
AT17:
AT18:
AT19:
AT20:

Comments:
Three discretionary samples have been added to this SAP table to account for any unexpected field conditions. The number of these samples is subject to change.

Analysis Suites:
Radiochemistry - Suite 1: Cm-Iso, Am-241, Ni-63, Np-237, Gamma Spec, Pu-Iso, U-Iso, Sr-90, Radium-226
Radiochemistry - Suite 2: Tritium, Iodine-129

Contingencies:

Sampling and Analysis Plan Table for Chemical and Radiological Analysis

Plan Table Number: V-TANK_SOILFY04

SAP Number: ICP/EXT-04-00289

DRAFT

Date: 08/17/2004 Plan Table Revision: 0 Project: TAN V-TANK SURROUNDING SOIL Project Manager: JESSMORE, J. J. SMO Contact: ELDER, T. E.

Sample Description						Sample Location				Enter Analysis Types (AT) and Quantity Requested																			
Sampling Activity	Sample Type	Sample Matrix	Coll Type	Sampling Method	Planned Date	Area	Type of Location	Location	Depth (ft)	AT1	AT2	AT3	AT4	AT5	AT6	AT7	AT8	AT9	AT10	AT11	AT12	AT13	AT14	AT15	AT16	AT17	AT18	AT19	AT20
										C2	F1	PC	PB	RH	RN	EL	EM	TI	TA	TV	LM	VL	VM						
VTR010	QC	WATER	RNST		12/2004	TAN V-TANK	EQUIP. RINSATE	POST SAMPLE QC	N/A			1		1	1	1					1	1							
VTR011	REG	SOIL	COMP		12/2004	TAN V-TANK	VALVE PIT 2	EXCAVATION #1	SURFACE	1	1	1		1	1	1					1	1							
VTR012	REG	SOIL	COMP		12/2004	TAN V-TANK	VALVE PIT 2	EXCAVATION #2	SURFACE	1	1	1		1	1	1					1	1							
VTR013	REG	SOIL	COMP		12/2004	TAN V-TANK	VALVE PIT 2	EXCAVATION #3	SURFACE	1	1	1		1	1	1					1	1							
VTR014	REG	SOIL	COMP		12/2004	TAN V-TANK	CUT PIPE AREA	EXCAVATION SOIL	SURFACE	1	1	1		1	1	1					1	1							
VTR015	REG	SOIL	COMP		12/2004	TAN V-TANK	RELEASE	EXCAVATION SOIL	SURFACE	1	1	1		1	1	1					1	1							

The sampling activity displayed on this table represents the first 6 to 9 characters of the sample identification number. The complete sample identification number will appear on the sample labels.

AT1: Cyanide
AT2: Fluoride
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AT4: PCBs - MS/MSD
AT5: Radiochemistry - Suite 1
AT6: Radiochemistry - Suite 2
AT7: SVOCs (CLP TAL)
AT8: SVOCs (CLP TAL) - MS/MSD
AT9: TCLP Metals
AT10: TCLP SVOCs

AT11: TCLP VOCs
AT12: Total Metals (CLP TAL)
AT13: VOCs (CLP TAL)
AT14: VOCs (CLP TAL) - MS/MSD
AT15:
AT16:
AT17:
AT18:
AT19:
AT20:

Comments:

Three discretionary samples have been added to this SAP table to account for any unexpected field conditions. The number of these samples is subject to change.

Analysis Suites:

Radiochemistry - Suite 1: Cm-Iso, Am-241, Ni-63, Np-237, Gamma Spec, Pu-Iso, U-Iso, Sr-90, Radium-226

Radiochemistry - Suite 2: Tritium, Iodine-129

Contingencies:

Appendix B

Potential Organic and Inorganic Contaminants in the V-Tanks

Appendix B

Potential Organic and Inorganic Contaminants in the V-Tanks

Table B-1. Potential Contaminants for Tanks V-1, V-2, V-3, and V-9.

	Potential Contaminants
V-Tanks Consolidated Wastestream	Antimony
	Barium
	Beryllium
	Benzene
	Bis(2-ethylhexyl)phthalate
	Bromomethane
	Cadmium
	Chloroethane
	Chloroform
	Chloromethane
	Chromium
	1,2-Dichlorobenzene
	1,3-Dichlorobenzene
	1,4-Dichlorobenzene
	3,3-Dichlorobenzidene (Dibenz (a,h) anthracene)
	1,1-Dichloroethane
	1,2-Dichloroethane
	trans-1,2-Dichloroethene
	2,4-Dimethylphenol
	2,4-Dinitrotoluene
	Hexachlorobenzene
	Hexachlorobutadiene
	Hexachloroethane
	Indeno (1,2,3-cd) pyrene
	Lead
	Mercury
	Methylene Chloride
	2-Methylphenol (o-cresol)
	4-Methylphenol (p-cresol)
	Naphthalene
	Nickel
	Nitrobenzene
	Pentachlorophenol

Table B-1. (continued).

	Potential Contaminants
	Phenanthrene
	Phenol
	Pyridine
	Silver
	Tetrachloroethene
	Thallium
	1,2,4-Trichlorobenzene
	1,1,1-Trichloroethane
	Trichloroethene
	2,4,6-Trichlorophenol
	Vinyl Chloride
	Note: PCBs > 50 ppm present in sludge phase